# Products Finishing

CLEANING
PLATING
POLISHING
FINISHING

MAY 1952

# Completely Finished . . .

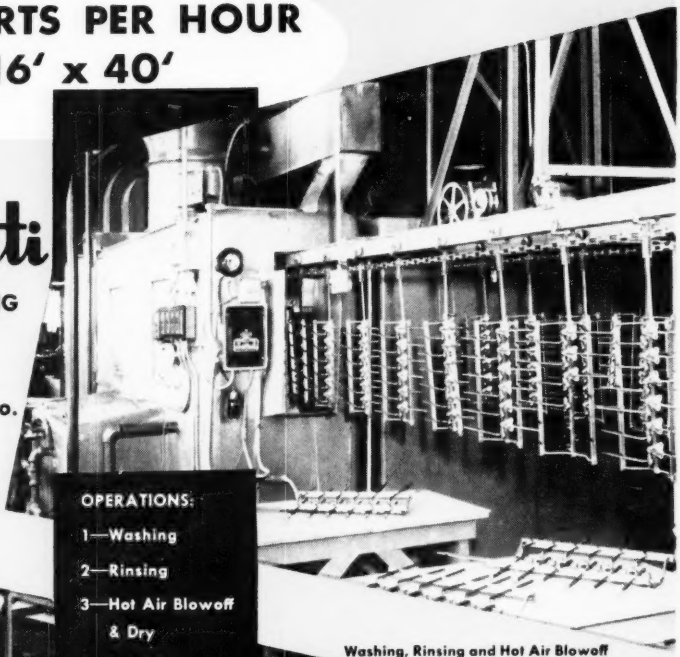
## 1000 PARTS PER HOUR in Space 16′ x 40′

ENGINEERED BY . . .

**Cincinnati**

CLEANING AND FINISHING MACHINERY CO.

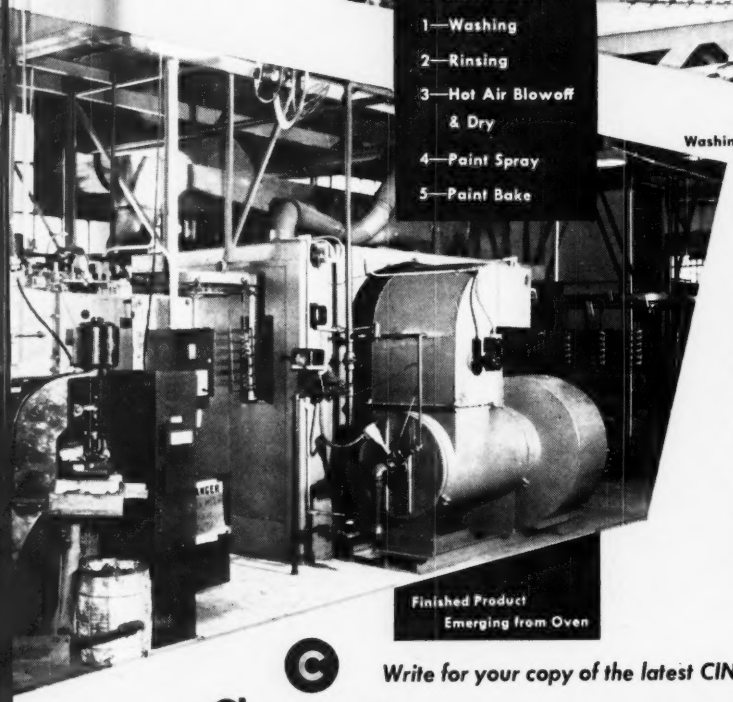
at The George R. Carter Co.
Detroit, Mich.



Washing, Rinsing and Hot Air Blowoff

OPERATIONS:

1—Washing
2—Rinsing
3—Hot Air Blowoff & Dry
4—Paint Spray
5—Paint Bake



Finished Product Emerging from Oven

Unusually compact, this CINCINNATI - engineered small parts finishing system has proved to be a major improvement in The George R. Carter Company's production facilities. Complete finishing operations on automobile trim hardware, parts are performed efficiently and quickly.

With a minimum of adaptation this Cincinnati system can handle a large variety of small parts. Representative installations have shown savings up to 75% in time and cost.

*Write for your copy of the latest CINCINNATI catalog today!*

**Cincinnati** CLEANING & FINISHING MACHINERY CO., INC.

311 HECLA STREET IRONTON, OHIO

WHAT'S YOUR METHOD FOR PREPARING STEEL FOR PAINTING?
IS IT GOOD FOR ALUMINUM? HOW ABOUT ZINC DIE CASTINGS?
DOES IT SAVE TIME? DOES IT PREVENT CORROSION?
YES! YES! YES! I USE THE OAKITE CRYSCOAT METHOD. IT SAVES ME PLENTY OF TIME AND MONEY

The OAKITE CrysCoat* PROCESS does three things at one time:

1 **Cleans metal rapidly**—removing cutting, drawing, stamping oils and compounds, rust preventives, fluxes, smuts and other soils.

2 **Conditions metal for painting**—preparing steel, aluminum, zinc die castings and other metals for lasting adhesion of paints, lacquers and enamels.

3 **Increases resistance to corrosion**—preventing it before painting; localizing it after painting.

Eliminating the need for separate cleaning and phosphating operations, the OAKITE CrysCoat PROCESS cuts costs these ways:

- **Uses less equipment**
- **Cuts operating time**
- **Reduces heating costs**
- **Saves cost of acid-proof equipment**
- **Reduces scaling and sludging**
- **Saves paint**
- **Reduces rejects**

**FREE** Write to Oakite Products, Inc., 20 Rector St., New York 6, N. Y., for a copy of *"The OAKITE CrysCoat PROCESS"* describing 19 advantages. *Reg. U.S. Pat. Off.

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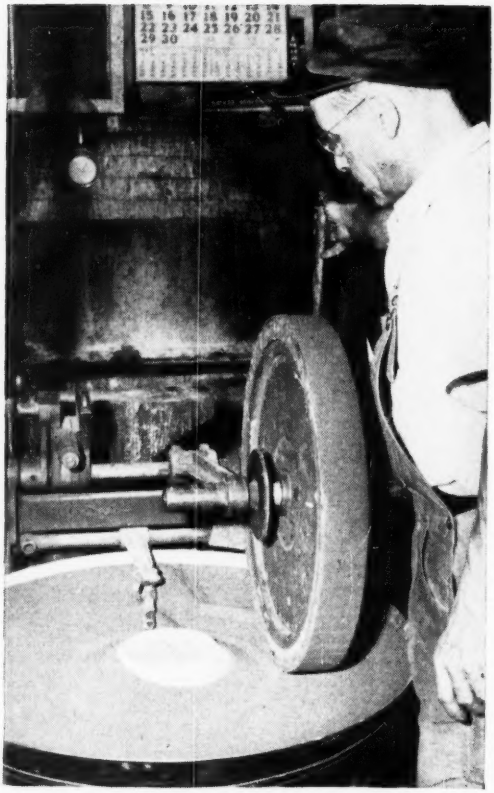
**OAKITE** SPECIALIZED INDUSTRIAL CLEANING MATERIALS • METHODS • SERVICE

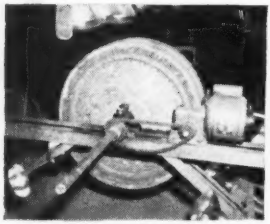
# Put these practical tips to work for you

***44-page book shows you how to set up metal polishing wheels and belts***

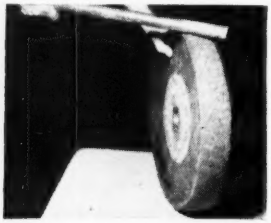
Plan now to take advantage of the wealth of information in the Norton Booklet No. 1340, "Setting Up Polishing Wheels and Belts." This useful booklet tells how to prepare the glue, how to set up wheels using either glue or cement, how to set up abrasive belts, how to get the best results from polishing. It contains detailed information on abrasive grain for polishing, including tables for selecting grains. Norton Company, Worcester 6, Mass. Distributors in all principal cities. Export: Norton. Behr-Manning Overseas Inc., Worcester 6, Mass.



**HOW TO SET UP** a polishing wheel. Glued wheel, shown here, is automatically rolled in a trough of abrasive grain. To minimize jelling, the setting-up operation is carried out as quickly as possible.



**HOW TO DRY** a polishing wheel. Infrared lamps dry wheels faster and permit smaller inventory of wheels. Note mechanism for rotating wheels easily. Ideal dry room maintains temperature of 85° F. and 50% relative humidity. When wheel cracks readily, it is dry.



**HOW TO CRACK** the wheel head. Wheel face is hit at about a 45° angle, being struck completely around the wheel once or twice. It is then hit at an angle that forms an "X" with the first series of cracks. A round bar or pipe, *not a sharp tool*, is used.

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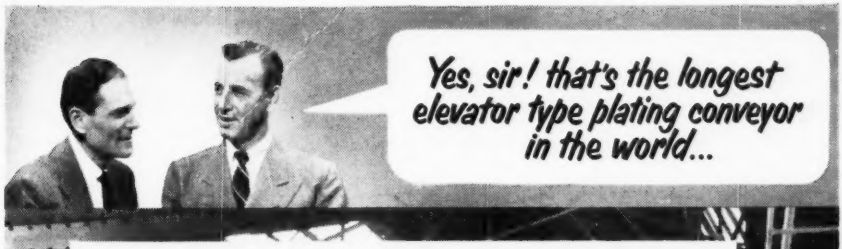

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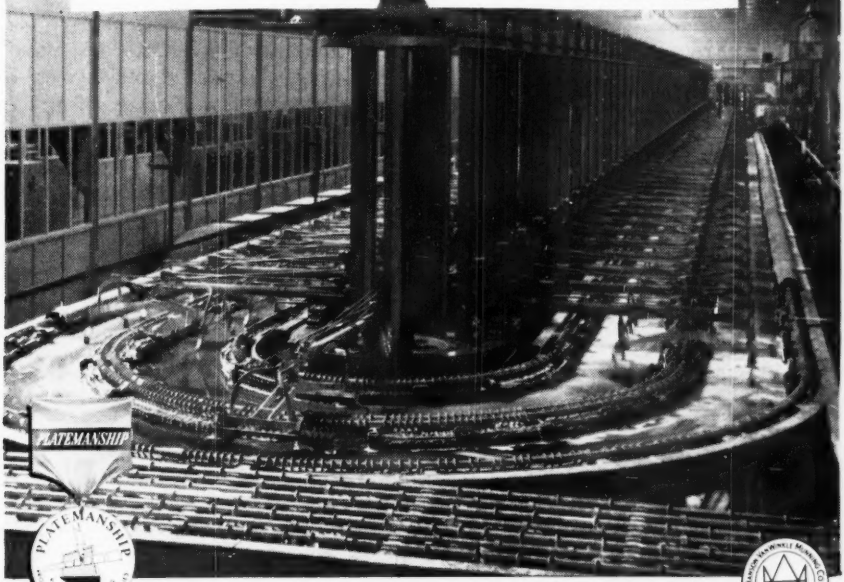
*Ford Motor Company

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# Products Finishing

MAY 1952
VOLUME 16 : NUMBER 8

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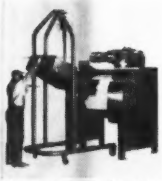

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An example of Supersheen superiority. This advanced design barrel handles micro-finishing of small precision parts with same ease of fast cutting down of larger castings, forgings, etc.

Why worry about man power shortages and high-cost labor? These two BIG PROBLEMS are now being solved by large and small manufacturers with Supersheen Advanced Barrel Finishing Equipment. *A SINGLE UNIT INSTALLATION REPLACES FROM 2 TO 12 MEN;* savings run as much as 95% under former finishing methods. Mail coupon at right for complete information.

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**ALBERT LEA, MINNESOTA**

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AMBLER CHEMICALS ACP PROCESSES PENNA.

# Technical Service Data Sheet

# Subject: RUST PROOFING WITH PERMADINE®

## INTRODUCTION:

Rust proof coatings find many practical applications. During World Wars I and II most small arms were rust proofed by zinc phosphate coating, impregnating with chromic acid and finishing with a rust-preventive oil, or cutback petrolatum. This not only provided excellent corrosion resistance but also yielded a dull black non-reflecting surface.

Ferrous metal parts that have been Permadized in a zinc phosphate chemical solution and then "sealed" with a rust-preventive oil such as "Granoleum" are effectively protected from rust-damage. In addition, if the surface is accidentally chipped or scratched, rusting is confined to the exposed area.

## PERMADIZING:

For the most effective rust proofing of large or small work in large or small production, "Permadine" is used in tanks in an immersion process. The coated parts are rinsed in clean water, and then in a controlled dilute acidulated solution. After drying, a suitable corrosion-resistant oil such as "Granoleum" is applied.

Operations can be carried out with the work in crates or hung from hooks, utilizing an overhead rail and hoists. For large volume production, automatic equipment can be used to mechanize the line. Small parts can be treated in tumbling barrels.

## "PERMADINE" DATA CHART

| | |
|---|---|
| Type of coating | Zinc phosphate |
| Object of coating | Rust and corrosion prevention |
| Typical products treated | Nuts, bolts, screws, hardware items, tools, guns, cartridge clips, fire control instruments, metallic belt links, steel aircraft parts, certain steel projectiles and many other components |
| Scale of production | Large or small volume; large or small work |
| Method of application | Dip, or barrel tumbling |
| Equipment notes | Immersion tanks of suitable capacity. Cleaning and rinsing stages can be of mild steel. Coating stage can be of heavy mild steel or stainless steel. |
| Chemicals required | "Permadine" No. 1 |
| Pre-cleaning methods | Any common degreasing method can be used. Alkali cleaning ("Ridosol"), Acid cleaning ("Deoxidine"), Emulsion-alkali cleaning ("Ridosol"-"Ridoline"); vapor degreasing, solvent wiping, etc., are examples. |
| Bath Temperature | 190° - 210°F. |
| Coating time | 20 - 30 minutes |
| Coating weight range Mgs./Sq. Ft. | 1000 - 4000 |
| Government Finish Specifications | U.S.A. 57-0-2C; Type II, Class B<br>MIL-C-16232; Type II. |

CHEMICALS ACP PROCESSES

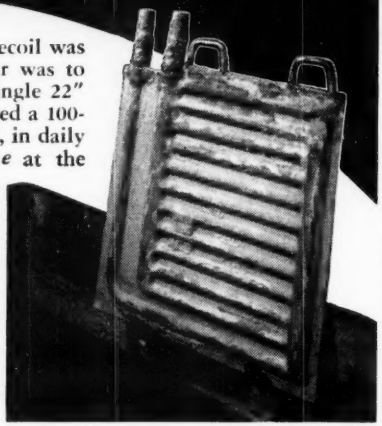
WRITE FOR FURTHER INFORMATION ON "PERMADINE" AND YOUR OWN METAL PROTECTION PROBLEMS

CHEMICALS ACP PROCESSES

# NO DOWNTIME
## *in over a year using a* PLATECOIL *in a parkerizing tank*

REPLACES PIPE COIL

The only time this Platecoil was removed in over a year was to take its picture. The single 22" x 23" Platecoil has heated a 100-gallon Parkerizing tank, in daily use, *without downtime* at the Lycoming Spencer Division of Avco Corp. Built of Electro-Polished Stainless Steel, the Platecoil has required no cleaning or repairs. Platecoils will replace pipe coils at a savings in any heat transfer application.



Send for complete technical manual and descriptive Bulletin No. P50.

PLATECOIL
Division
KOLD-HOLD MFG. CO.
LANSING 4, MICHIGAN

## Why Platecoils Cost Less

### LOW FIRST COST

The initial cost of Platecoil is often 50% or more below the cost of equivalent pipe coil depending, of course, on the materials used in construction

### EASY INSTALLATION

By the use of "quick change hangers" Platecoil installations can be made in open tanks in one-half hour or less by one man and a helper.

### NO THREADED JOINTS IN TANK

The entire Platecoil is electric welded and pressure tested. There are no joints to corrode or leak. Both connections to the Platecoil can be located above the liquid level where there is no danger of thread corroding and freezing.

### GREATER TANK CAPACITY

A 22" x 47" Platecoil gives the same heat transfer surface as 32 feet of 1½" pipe. This pipe requires a space approximately 30" x 60". Platecoil thus saves about 50% over equivalent pipe coil.

### WEIGHS 50% LESS

Weighing only about half as much as equivalent pipe coil, Platecoil is easy to handle. A whole maintenance crew is not needed to transport and install Pipecoil.

### TANK MAINTENANCE WITHOUT LOSS OF SOLUTION

There is no need for workmen to get inside the tank in order to make replacements or repairs. A Platecoil can be removed in a matter of minutes with the solution still in the tank.

### LITERATURE

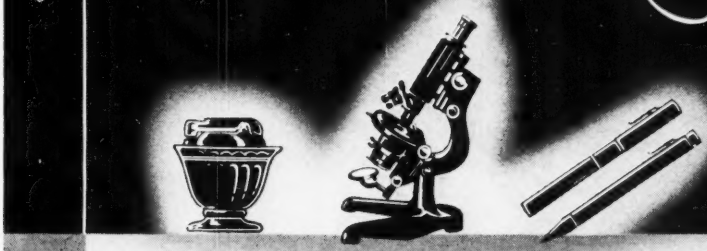
The new Platecoil Bulletin furnishes a complete description of the Platecoil method of tank heating. Write for your copy today.

### HIGH BTU TRANSFER

More prime surface of Platecoil can be installed in a given area than can be obtained with pipe coil. Thus a more compact Platecoil unit provides much greater BTU transfer per unit area than can be obtained with pipe coil. Quick starts in heating tank solutions mean more hours of productive time.

**Kold-Hold Manufacturing Company, Lansing 4, Michigan**

# Rhodium Plating



Rhodium is one of the six platinum group metals. It is hard and has an untarnishable brilliant white color. In electroplating, it produces beautiful results and is widely used for this purpose in jewelry — even precious metal jewelry. Its high reflectivity makes it excellent for mirrors for motion picture projectors and similar purposes. With restrictions upon usual plating metals, rhodium is the logical alternative for plating optical mounts, contacts for communication equipment, radar components, pen and pencil sets and a host of like objects.

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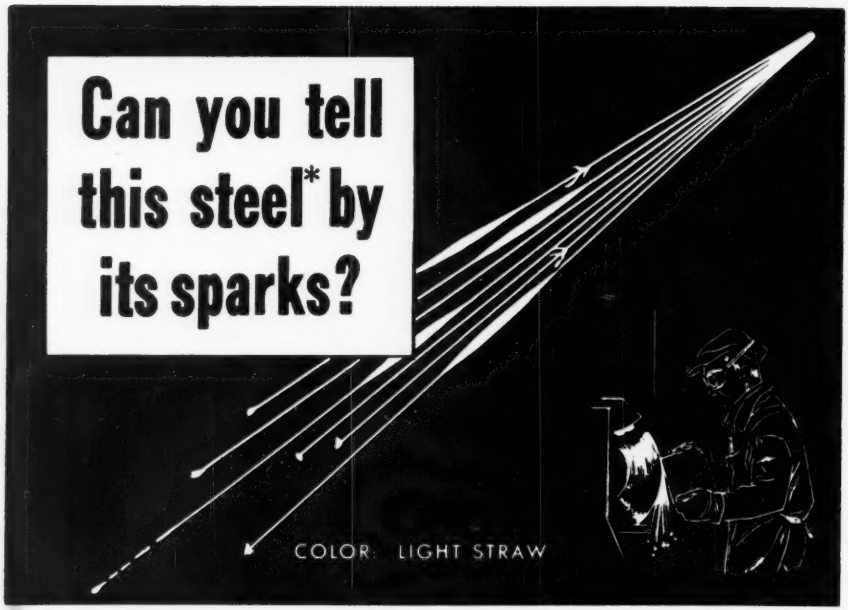
# Can you tell this steel* by its sparks?




It takes an expert to recognize a steel by the spark pattern it throws. But you need not be an expert to recognize a 3M abrasive belt in use. The more sparks you see, the more certain you can be that a 3M belt is doing the job.

3M belts cut faster—last longer, too. Give better finishes at lower cost than ordinary abrasives. That's why smart operators everywhere insist on 3M belts for all types of grinding and finishing operations.

Our abrasive experts will be glad to demonstrate the advantages 3M belts have over the abrasives you are now using. Contact your nearest 3M branch office for immediate attention.

*(Sparks above identify wrought iron)*

Minnesota Mining & Mfg. Co., Dept. PF 52
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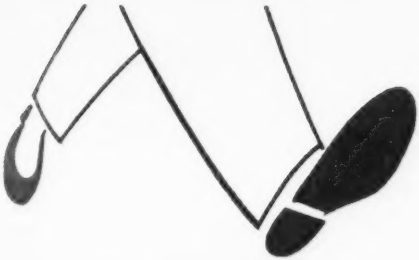

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*June 16 - 20 — Chicago*

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Featured articles, as well as the official program of the convention, assure intense readership. This issue will give comprehensive information to those unable to attend and will serve as a guide to those attending.

Already circulated to more electroplaters and allied trade readers than *any other* publication, extra copies of June PRODUCTS FINISHING will be distributed at the Exposition. This is an extra bonus to advertisers. PRODUCTS FINISHING regularly goes to a total circulation of more than 18,000.

The Convention is the Electroplating Industry's best market place. Use June PRODUCTS FINISHING . . . the industry's best showcase. Forms close May 16th. Make your space reservation now or write for additional information.

**PRODUCTS FINISHING, 431 Main St., Cincinnati 2, Ohio**

# How to Dispose of Waste Cyanide Solutions

**A DISPOSAL METHOD** now coming into wide use is that of oxidizing the cyanide ion to the much less toxic cyanate in a strongly alkaline solution.

**CYANATES** are about $\frac{1}{1000}$ as toxic as *cyanides*. Accordingly, waste containing 100 ppm cyanide becomes practically non-toxic if the cyanide is all oxidized to cyanate.

**THE OXIDATION OF CYANIDE** to cyanate is not only rapid, but it appears applicable to almost all types of cyanide wastes.

**MANY OXIDIZING AGENTS** can be used, but chlorine is probably the most satisfactory and cheapest. It may be fed as a gas, an aqueous solution, or as solid hypochlorite.

**FORTUNATELY,** after a basic solution of cyanide is oxidized to cyanate, the further addition of chlorine decomposes it to carbon dioxide and probably nitrogen or nitrogen compounds.

**PUBLIC SEWERS** are generally used as outlets for waste from plants that are not located on streams. Usually, higher concentrations are permissible than in streams, although local conditions and legal requirements dictate allowable practice. Actually, even though cyanates are not particularly poisonous, there is a tendency on the part of pollution control authorities to require destruction of the cyanates.

### A.E.S. RESEARCH PROGRAM

**THE AMERICAN ELECTROPLATERS' SOCIETY** is conducting a comprehensive research program and has developed useful information on current plating problems. International Nickel, in addition to its other support of this program, feels that it will be a further service to make copies of A.E.S. Research Reports available to electroplaters.

**THE SUBJECT OF CYANIDE WASTE TREATMENT,** approached from different viewpoints, is reviewed in A.E.S. RESEARCH REPORT, Serial No. 14, entitled: "Disposal of Plating Room Wastes." We offer you a free copy of this report. Mail coupon now.

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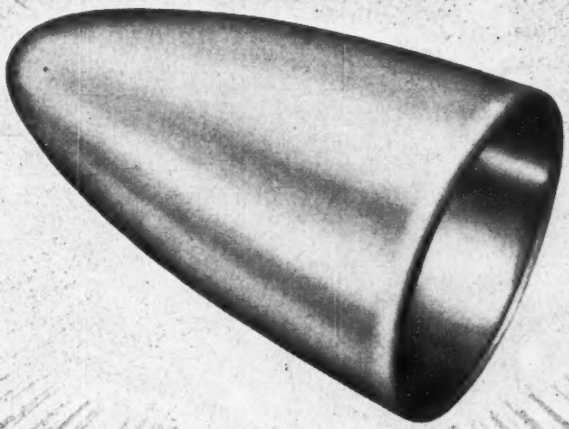

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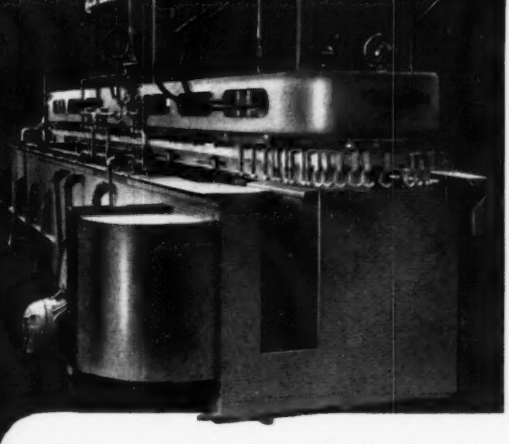

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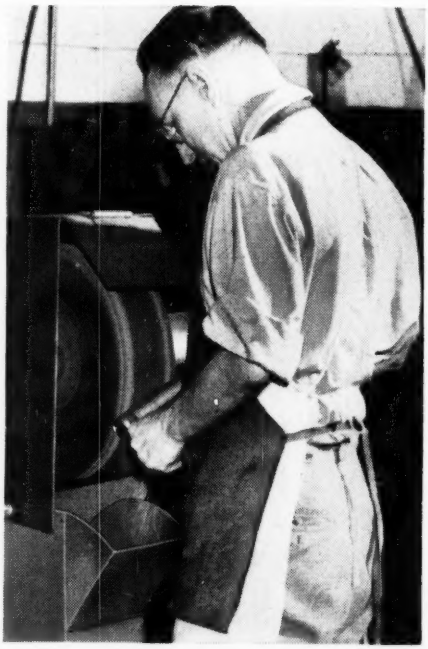

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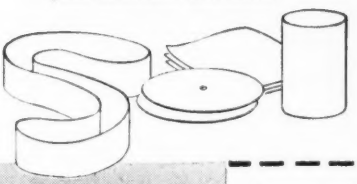

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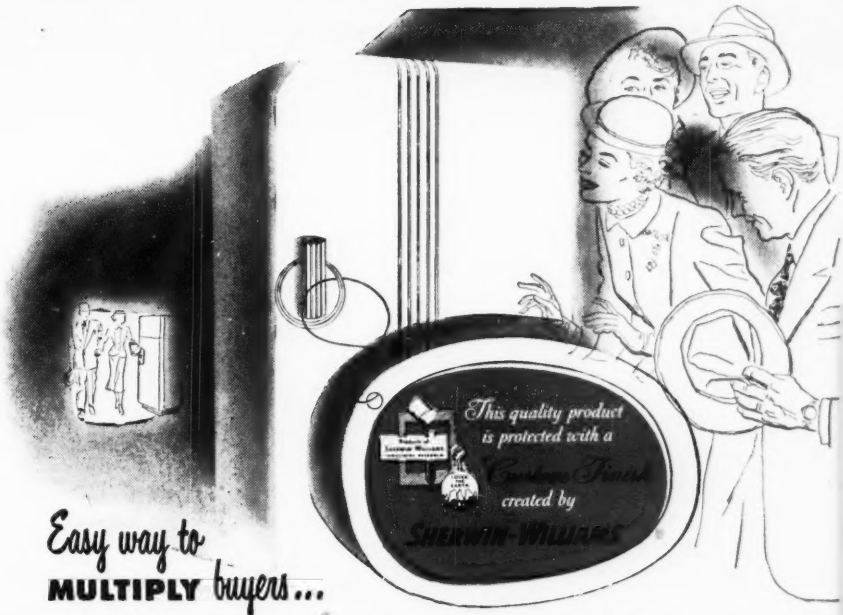


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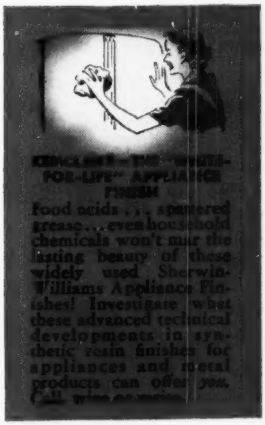

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The latest developments in metal cleaning research have been incorporated in HD-N to assure maximum detergency under all conditions of usage.

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HD-N penetrates and removes such soils as oil, carbon, grease, drawing compound, graphite, road and shop dirt in *one* cleaning operation. It is fast, thorough, and does a complete job . . . is readily and completely soluble in hot water.

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Pf editorial

Vol. 16, No. 8

MAY, 1952

# A Commendable Record

Sometimes it is difficult for us, who are worrying about inflation and wondering who the next president will be, to realize that we are fighting a war; that American blood is being spilled; that many young men will never come back again.

We have felt the pinch in that we have not been able to get this or that material for our shops and factories; we have been annoyed by the restrictions and the priority system used to allocate various metals. On the whole, however, we eat as well as ever, clothe ourselves as always, and have felt no serious physical hardships.

True, and naturally so, those who have had serious disruption of a business built during a lifetime of hard work, caused by a shortage of nickel, zinc, copper, or other metals or finishing materials, have complained about this condition. But complaint has never taken precedence over the national interest.

It is commendable that the Finishing Industry, from the manufacturer of the raw material to the man on the production line, in direct contrast with some of our less thoughtful and less patriotic citizens, has placed cooperation above its personal wants and wishes. It has improvised where necessary and found substitutes where possible. It has carried on its research and development to find ways to solve immediate, practical problems, and investigate causes and effects of a fundamental nature.

This commendable record of traveling down the right road is reflected not only in sustained and continued production at a time when such is vital, but it will be an important factor many years hence when the challenge of the future is met with results of work initiated today.

Frank L. Bovey

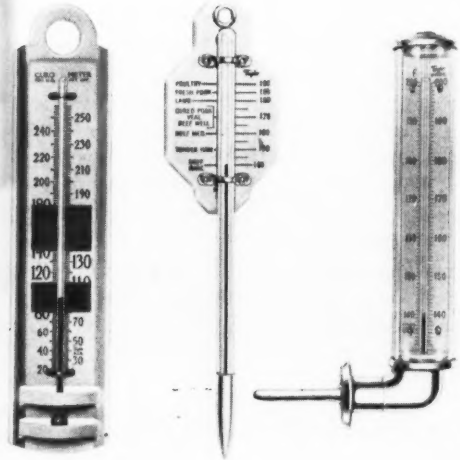
# Standard Finishing Specifications

By FRANK L. BOWER
Associate Editor

**Commercial and industrial instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, humidity, and viscosity are used in almost every kind of environment imaginable. To produce attractive finishes that meet these many different conditions requires the use of many finishing techniques for both organic and metallic coatings.**

pf FEATURE

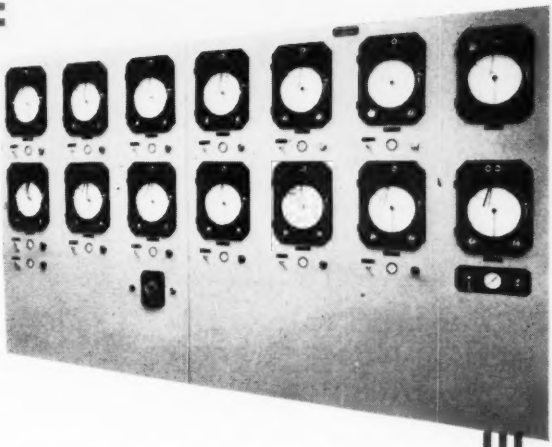
From roast meat thermometers to the highly complicated process control instruments used in the gaseous diffusion plant of the Oak Ridge Atomic Bomb Project, Taylor Instrument Companies today cover the field of instrumentation. Starting in 1851 as a small company for making household thermometers and barometers, the company expanded in 1896 with the addition of an industrial division; expanded again in 1905 when the first controllers were produced for industry. Since then it has grown continually, until today, in its 101st year, Taylor Instrument Companies make over 8,000 variations of its basic products. Its instru-



The Curo-Meter (left) used for tobacco curing, is finished in vitreous enamel; the scale is printed with a special ink.

The sheath of the roast meat thermometer (center) is made of special base metal for sensitivity. It is cleaned, barrel burnished, and barrel nickel plated. It is then racked and chrome plated. The thermometer back is finished with two coats of vitreous enamel. The scale is printed with special ink which, upon baking, fuses into the enamel.

Body of the Industrial Cleanliner Dairy Thermometer is an aluminum die casting on which a satin finish is produced prior to applying a white high luster enamel. The elbow ball angle is cut down and polished to a high luster. The stem sub-assembly must have a bacteria-proof contact area which is achieved by four progressively finer grinds, followed by buffing and coloring.

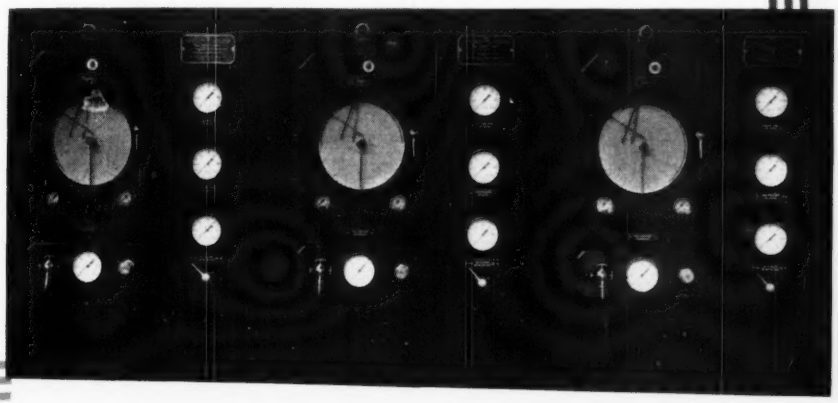


Instrument panels are finished in standard black or in special colors to match existing installations or special color schemes. For this gray panel, a special gray baking primer and a customer specified enamel were used. The aluminum door handles were finished with three coats of Taylor Dull Black Baking Enamel.

ments serve the home, the medical profession, and industry, being applied in the latter instance to a large variety of continuous processes in such fields as chemicals, textiles, foods and beverages, plastics and other synthetics, petroleum, paper and photographic film.

When so many products for so many applications are required, it is necessary to establish a system of standardized finishing specifications. Modern "standards" applied to finishes cannot be permanently fixed rules as the term implies, but rather are current rules that require frequent revision to maintain them up to date in ac-

Taylor Specifications for standard black panel boards call for the following finishing procedure: degrease, apply one coat of black primer, bake, fill pits with special baking putty, bake, sand, repeat steps 2 and 3 until smooth surface is achieved, sand, apply one coat of Taylor Dull Black Enamel, bake, apply second coat of same enamel, and bake.



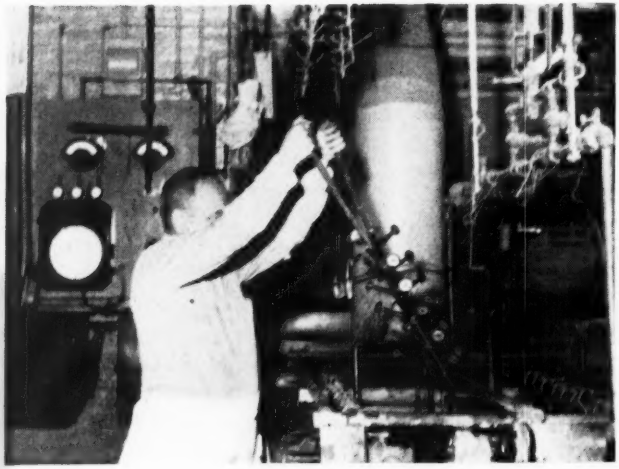


Fig. 1 — Brass drive gears for recording instruments are lifted out of the chromium plating tank, the fifth of nine steps as listed in the specification for this part. *(PRODUCTS FINISHING Staff Photo)*

cordance with the best practices and materials. In some industries, standards may be practices or limiting conditions — established or authorized models by which comparisons can be made—that have grown up from habit, usage, and tradition of a plant. In the finishing industry both definitions hold true, because the air pressure used in applying a specific finish with a spray gun may be a matter of the foreman's experience. However, more often, processes, and the results that are obtained from them, can be closely folowed and measured in the modern laboratory. Therefore, the laboratory can judge and set the desired standard, and specify the finishing procedure to be used so that end results may meet these standards.

**Standard Finish Specification System**

Standard Finish Specifications for Taylor Instrument Companies are prepared or approved by the chemical laboratory after consultation with both the engineering department and the factory to determine the requirements of service and manufacturing techniques. The finish specification number or designation is then incorporated on new part or assembly drawings by the engineering department, and the details of the specification are used in the preparation of Standard Operation Sheets by the methods engineering department.

The various finishes are classified in "Process Instructions and Specification" sheets for Plating, for Organic Finishes, and for Miscellaneous Non-Organic Finishes. The standard sheets for Plating (6-A-1) describe in general the various types of plating which the plants are equipped to do and prescribe the methods of notation on engineering drawings and specifications. They list no less than five different standards for nickel plating, five for brass and bronze plating, three for copper, six for silver, and six for chromium, one each for lead, cadmium, tin, and zinc. Thickness ranges for each kind of plating and recommended applications are also included. The standards for Organic Finishes and Miscellaneous Non-Organic Finishes (bright dipping, etching, polishing, etc.) are indexed, and show in this index the standard number and a very brief description of the process such as "Gloss White Baking Enamel on Aluminum" or "Bichromate Etch with Polished Brass Highlights."

Detailed finish specifications are grouped in another section as follows:

The TP Group—Non-Organic Finishes—Plating.

The TF Group—Organic Finishes.

The TM Group—Miscellaneous Non-Organic Finishes.

The specifications designate the condition in which the parts are to be delivered for finishing and the proper sequence of essential steps required for the process. They are used by the Methods Engineering Department in preparing Standard Operation Sheets for each of thousands of different parts from raw material to finished part.

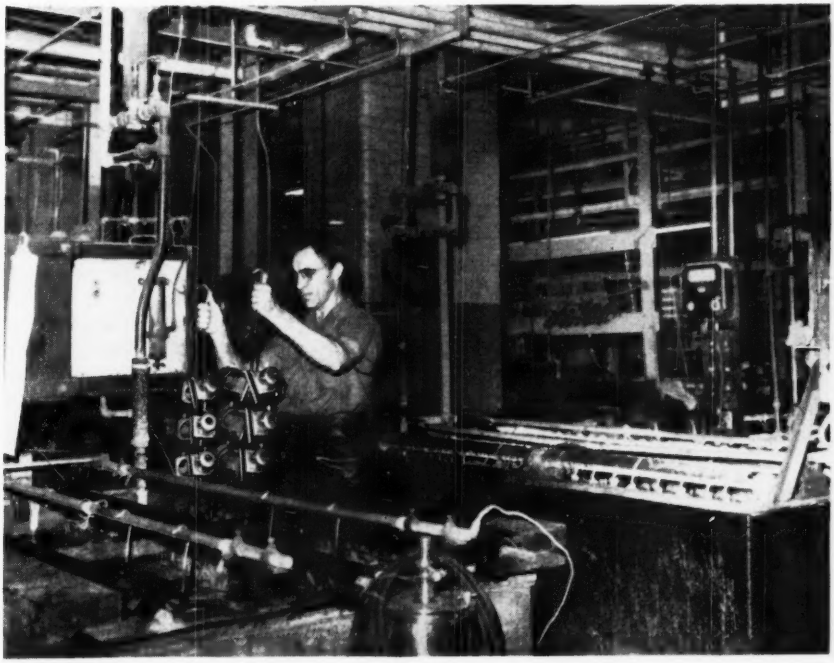
### Plating Finishes

The TP Group for plating finishes gives all the essential steps in each of the various plating processes including such controlling factors as time, temperature, special cleaning solutions, etc. For example, Fig. 1 shows brass gears for recording instruments being lifted out of a chromium plating tank. Specification TP4A for this process is as follows:

1. Clean in alkaline cleaner.
2. Rinse in cold water.
3. Sulfuric acid dip.
4. Rinse in cold water thoroughly.
5. Chrome plate.
6. Rinse in chrome dragout tank.
7. Rinse in cold water.
8. Rinse in hot water.
9. Dry.

Figure 2 shows the application of

Fig. 2—Brass bellows housings, hand silver soldered to steel attaching rings, are copper and nickel plated, the latter operation being shown in this photo. Current control instruments, automatic heating valves, and oscillating mechanisms may be clearly seen in this photo. (*PRODUCTS FINISHING Staff Photo*)



"Nickel Plate on Copper Plated Brass" according to Specification TP10A. Following are the processing steps of this specification.

1. Clean in alkaline cleaner.
2. Rinse in cold water.
3. Nitric acid dip.
4. Rinse in cold water.
5. Bright dip.
6. Rinse in cold water (2).
7. Cyanide dip.
8. Rinse in cold water.
9. Cyanide copper plate.
10. Rinse in cold water.
11. Muriatic acid dip.
12. Rinse in cold water.
13. Nickel plate.
14. Rinse in cold water (2).
15. Rinse in hot water.
16. Dry.

The bellows housings and steel attaching rings being plated in this operation are hand silver soldered and are used in Fulscope Temperature Controllers. The racks are coated with plastisol rack insulation.

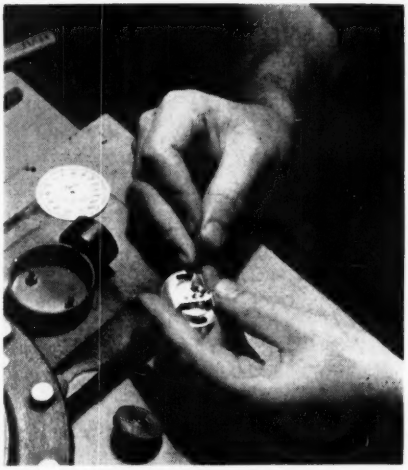


Fig. 4—Brass dials receive one coat of special flat white baking enamel. They are then baked, lithoprinted, and coated with a special flat lacquer.
*(Photo courtesy Taylor Instrument Companies, Rochester 1, N. Y.)*

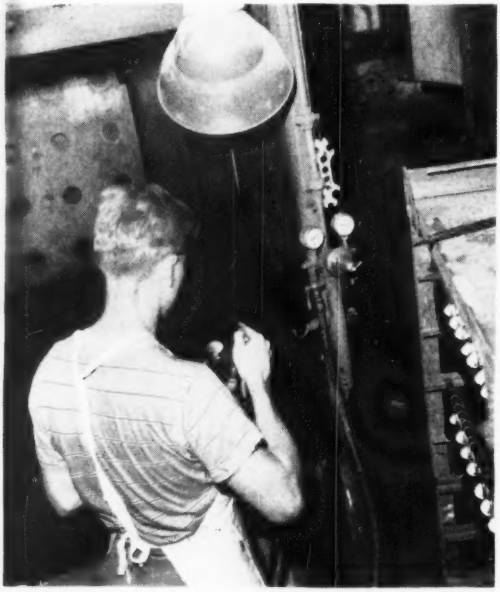


Fig. 3—The brass sphygmomanometer cases are sprayed with one coat of Black Wrinkle Enamel, followed by one coat of Gun Metal Synthetic Enamel.
*(PRODUCTS FINISHING Staff Photo)*

Since plated parts range from such very small items, as pointers, springs, and nuts, to comparatively large Motosteel* valve motors, the plating department must have considerable equipment to achieve the highest efficiency possible in its operations. Besides the still stanks which may be seen in Figs. 1 and 2, the department also has large and small barrel plating

* Reg. Trade Mark

equipment, a wide variety of rinsing tanks, and so forth.

### Organic and Miscellaneous Finishes Specifications

Organic finishing specifications range from black to white in color; from baking to air dry enamels; from lacquers to varnishes to synthetics; from spray to silk screen painting; and are applied on glass and all types of metals that have been prepared by methods varying from anodizing to sandblasting.

Included in these specifications is lithoprinting, a necessary process for the making of metal scales and dials. In all, over 250 different kinds of organic finish specifications are listed. Figs. 3 and 4 show steps in the assembly and finishing operations of sphygmomanometers. The case is finished with a gun metal wrinkle according to TF43, which reads as follows:

Brass parts are to be delivered in suitable condition for finishing by the following operations:

1. Bright dip according to TM2B.
2. Sandblast.
3. Apply one coat Black Wrinkle Enamel.
4. Bake at 300 deg. F. for 2 hours.
5. Apply one coat Gun Metal Synthetic Enamel.
6. Bake at 300 deg. F. for 1 hour.

Since the dials are manufactured from finished brass sheets, the coatings must be flexible enough to withstand the shearing, perforating, blanking, and forming operations. The specification for the finishing of brass sheets for dials according to TF1A is:

1. Clean with solvent or alkali cleaner.
2. Sandblast face (light sandblast back).
3. Apply one coat Special White Baking Enamel.
4. Bake at 250 deg. F. for 15 minutes.
5. Repeat Steps 3 and 4 where two coats are required.
6. Lithoprint.
7. Apply one coat Special Flat Lacquer.

In order to have a constant supply of materials and ensure uniform finishes in accordance with the stand-

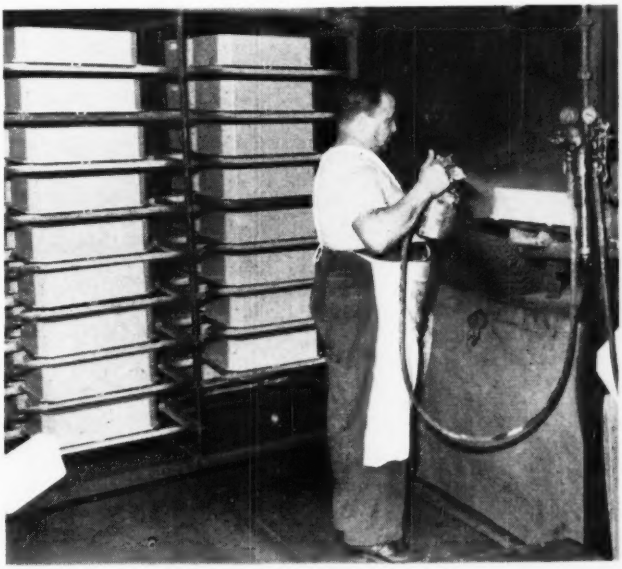


Fig. 5 — Aluminum die-cast recorder cases receive a primer coat on a turn table in a spray booth. They are then loaded on dollies, ready for the baking oven. (*PRODUCTS FINISHING Staff Photo*)

Fig. 6—Removal of burrs on steel instrument parts—Standard 5A; Specification No. TM5A—is accomplished in a tumbling barrel. (*PRODUCTS FINISHING Staff Photo*)

ards, alternate finishing materials and sources of supply are maintained wherever possible.

The miscellaneous standards list such operations as Bright Dip—on Brass, Soldered or Brazed; Deburring—Steel; Degrease—All Metals; Pickle and Bright Dip—Brass; Strip and Replate Cadmium—on Steel; Circular Grain Finish—on Brass; and Color Buffed Finish for Stainless Steel.

From this list it may be seen that besides chemical and electrochemical finishes, a complete list of mechanical finishes is used. Figure 6 shows a Globe rotary tumbling barrel in action, and Fig. 7 a buffing operation on a brass valve with a taper air release valve for a sphygmomanometer. The buffing operation is preceded by a bright dip and polish for this specific part, and it is being conducted with a loose buff running at 2700 r.p.m. on a Hammond variable speed polishing lathe. The final finishing operation on the valve is chromium plating for corrosion and wear resistance.

The specification for deburring steel (Fig. 6) according to TM5A reads:

1. Parts should be clean.
2. Run in deburring barrel with proper compound and jacks or shapes.
3. Thorough rinse in cold water.
4. Clean in alkaline cleaner.
5. Dry.

### Factory Operation Sheet

The detailed specification sheets (TP, TF, and TM Groups) discussed up to this point are used by the Methods Engineering Department in preparing Standard Operation Sheets for the individual parts.

These sheets then go to the men in the plants who actually perform the operations. They show the name of the operation, the name of the part that is to be finished by that specific operation, the specification number, and the type of metal. Further, they show the bin or basket number from which the parts can be obtained.

Most important, however, the sheets not only show each step of the process

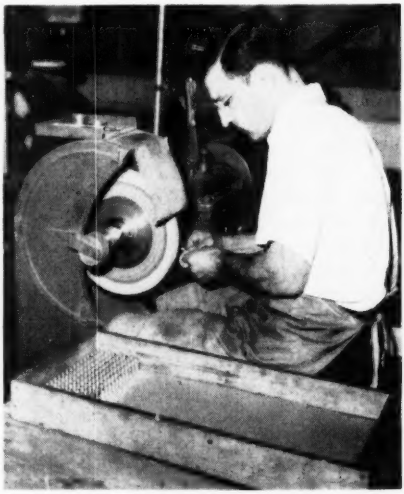


Fig. 7—Buffing a brass valve body with a taper air release valve for a blood pressure measuring instrument. (*PRODUCTS FINISHING Staff Photo*)

but also tell the worker exactly how to proceed in the cycle of operation, starting with the first step, "Get work from bunk," down to the last step, "Carry to bunk." When advantageous, these steps also specify what operations are done with the left hand and what operations are done with the right hand.

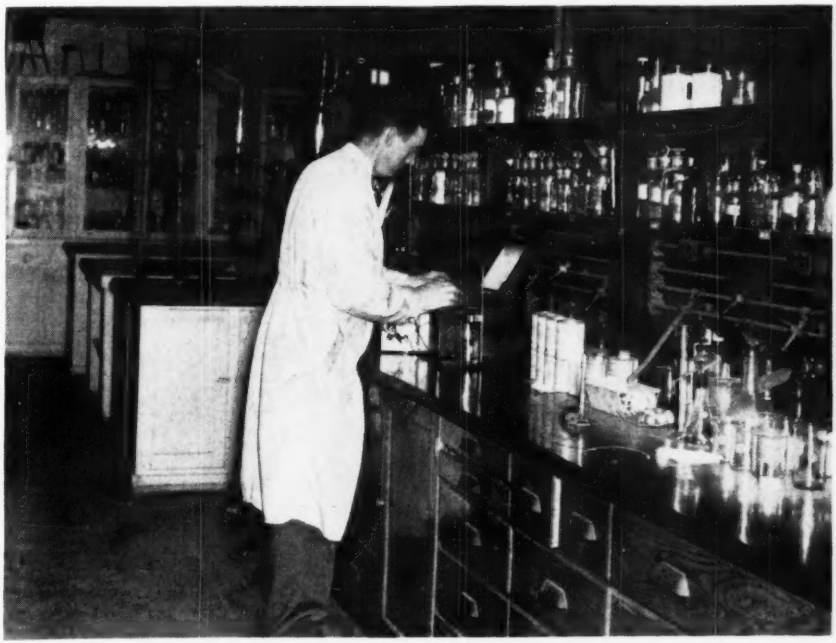
In plating operations the rack or basket to be used is designated; the number of parts to be put on the rack or in the basket is listed; and necessary procedures that are not obvious, such as "Shake plating basket while in nickel bath," are indicated at the appropriate step in the cycle.

In organic and miscellaneous finishes the same procedure is followed. In short, the Factory Operation Sheet shows the cumulative work of the chemical laboratory, the design engineering department, the methods engineering department, the production planning department, and the operation sheet control department. It can also be seen what far-reaching influence the finish of a product exerts, even in the primary design of a part. For, if the part is to be plated, the design engineer must know what can and cannot be plated; the finishing engineer must know the finish he wants —based on the requirements of service; and the methods engineer, in planning the manufacturing process, must understand what the service requirements are and how the finishes are applied.

### Chemical and Testing Laboratories

Among the functions of the chem-

Fig. 8—The chemistry laboratory, origin of Taylor Standards for Specification Finishes. *(Photo courtesy Taylor Instrument Companies, Rochester 1, N. Y.)*



ical laboratory are the development, preparation, and approval of all new or revised detailed specifications. To fulfill these functions, one section of the laboratory is devoted to research to find new finishes (see Fig. 8), and one section is devoted to the actual testing of the new materials (see Fig. 9).

Equipment for testing the many finishes includes: Taber Abraser for abrasive tests; Bell Telephone Mandrel Tester to test adherence of coatings; Gardner Laboratory Impact Tester for finding the impact resistance of the finishes; and the Hoffman Scratch Hardness Tester. Standard Salt Spray Tester, Paint Booth and Baking Oven constitute some of the other equipment found in this laboratory.

The row of outdoor thermometers, which may be seen in the foreground of Fig. 9, has just undergone a salt spray exposure test. The production of these thermometers runs close to 10,000 a week, and the finish is designed to meet all atmospheric conditions that may be encountered throughout the world.

Revisions in existing specifications may be made by the chemical laboratory for any one of a number of reasons. Some of the reasons for revisions are: improvements in the finish, increase in economy, or a change in the source of supply. The standards are then revised and reissued accordingly. No changes in engineering drawings are required, since the revised standard has the same number or designation as appears on the drawing.

Another laboratory is used exclusively for testing instruments. Here, life tests on performance and many other tests are conducted on the in-

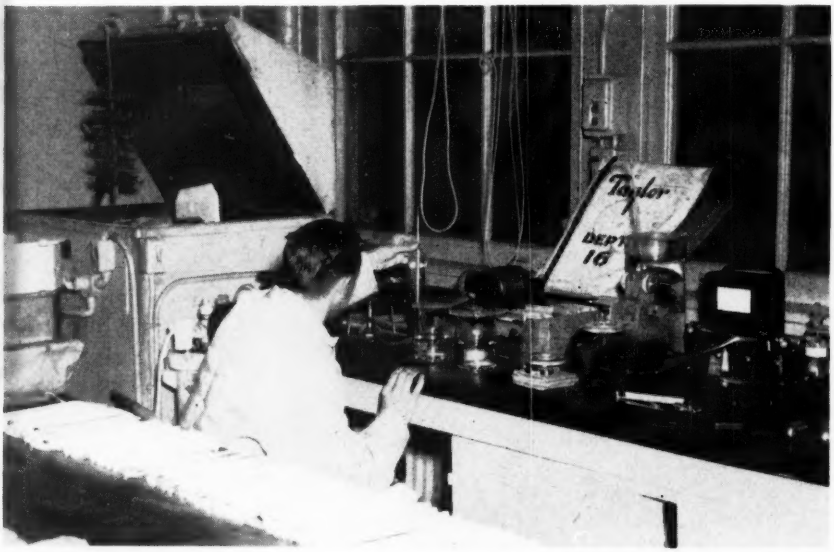



Fig. 9—A chemist measures the concentration of salt brine in the spray cabinet. Thermometers which have been subjected to the salt spray test may be seen in the foreground. Various testing instruments for testing properties of finishes can be seen on the table.
*(Photo courtesy Taylor Instrument Companies, Rochester 1, N. Y.)*

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struments. It has been said that this laboratory tries to tear down what the others have built up. And consistent with good management technique, the chemical laboratories and the test laboratories report to different executives.

ACKNOWLEDGMENT

The author acknowledges with sincere thanks the assistance and cooperation of P. W. Aradine, Chief Chemist; M. W. Elmendorf, Standards Engineer, and H. A. Weaver, General Foreman, Finishing Division, Taylor Instrument Companies, in securing the information contained in this article.

## New and Revised ASTM Standards

Tentative Methods of Testing Drying Oils (D 555—5 T) have been designed to meet the need of the paint and drying oil industries for a comprehensive set of Methods for the purpose implied. They replace previous ASTM Methods D 555—47 T, D 555—50 T, and D 967—48 T, and include pertinent sections drawn from other related ASTM methods.

The new Method for Measurement of Dry Film Thickness of Non-Magnetic Coatings of Paint, Varnish, Lacquer, and Related Products Applied on a Magnetic Base (D 1186—51 T) (Magnetic Gage Method) supplements the Tentative Method of Test for Measurement of Dry Film Thickness of Paint, Varnish, Lacquer, and Related Products (D 1005—49 T). It is also recommended for thin films, less than 0.5 mil (0.0005 inch) in thickness. It does not apply to excessively soft films.

Tentative Specification for Asphalt Base Emulsions for Use as Protective Coatings for Metal (D 1187—51 T) is largely a performance-type specification, but does include some general requirements on composition of the material. This material has been in general use for about 20 years and there has been a need for specifications. Methods of tests for these materials were completed in 1949 and were issued under the designation D 1010—49 T.

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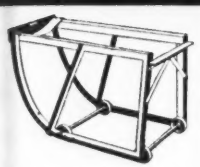

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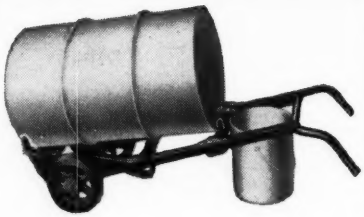

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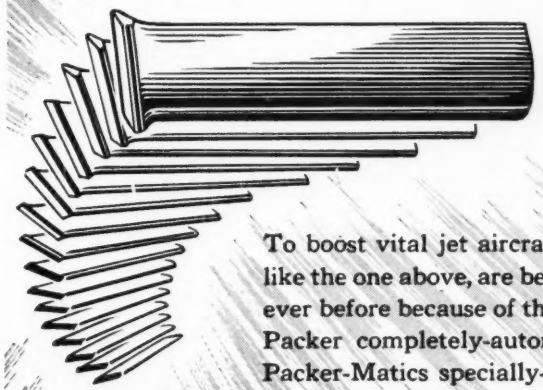

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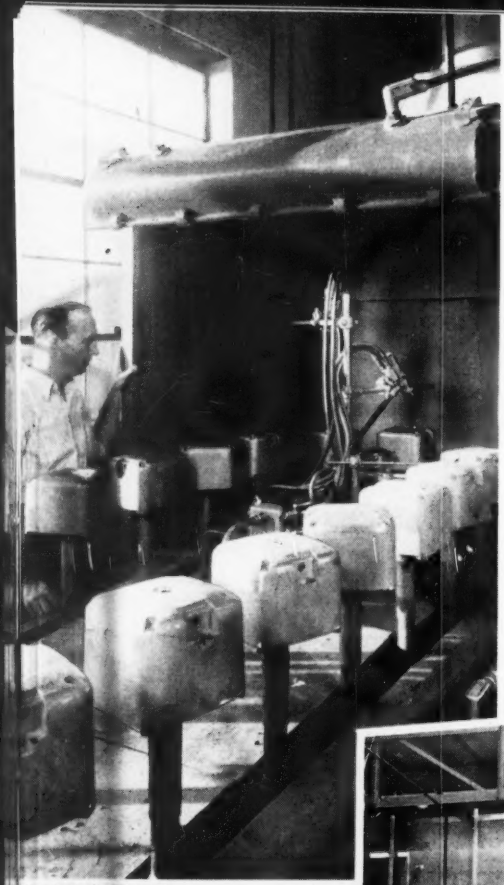
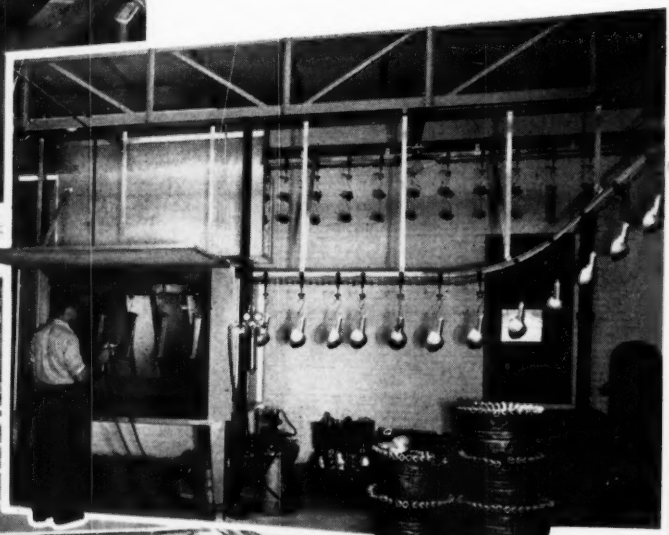
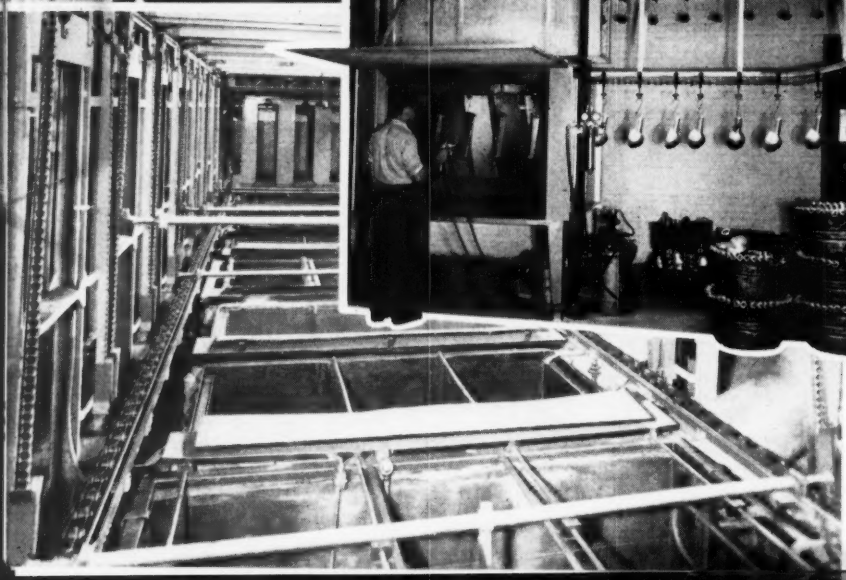
# Conveyor in Finishing

By ARTHUR P. SCHULZE
and FRANK L. BONEM
Associate Editor



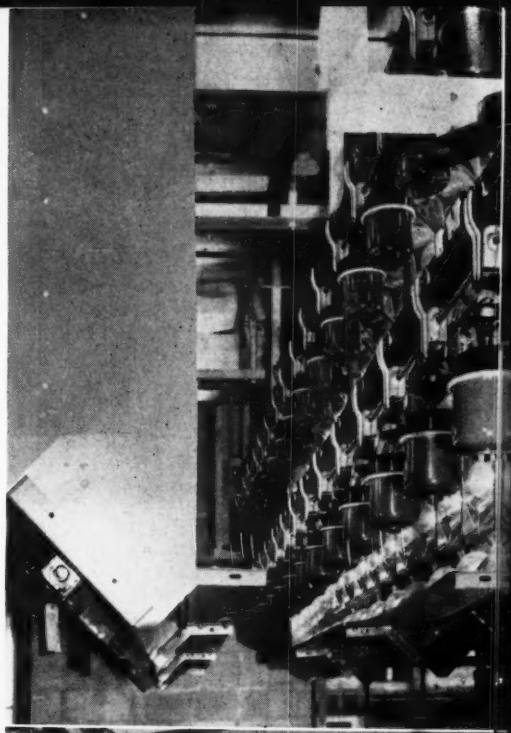


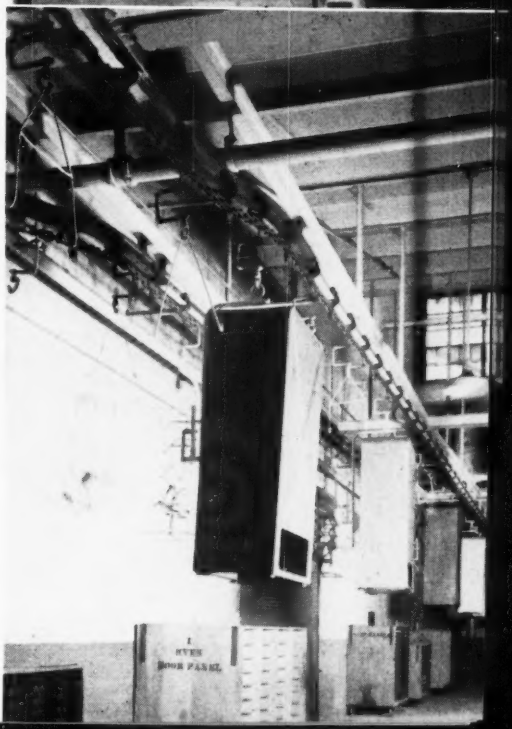


# Applications the Industry

## Part II

**Most types of conveyors found in the metal finishing industry have one common part—some type of chain. In this section, the authors discuss these chains and the various types of conveyors in which they are found, including such types as metal belt and roller conveyors.**





IN the field of material handling, the word conveyor may mean a screw conveyor, bucket conveyor, belt conveyor, or any one of a number of radically different types of engineering systems designed to move material from one place to another by mechanical power. In the metal products finishing field, this broad choice of equipment is narrowed to a considerable extent. Part I of this article was concerned with a discussion of the monorail I-beam conveyor, a basic component of which is some type of chain. Almost all other types of conveyors, which will be discussed in Part II, also have one or two strands of chain by which power and movement are transmitted.

### Chains

Drop Forged or Rivetless Chain is one of the most common types of chain,

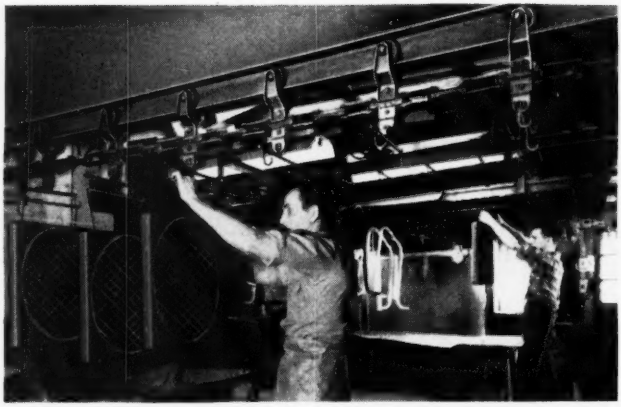


Fig. 2 — Table tops and other metal furniture are finished by painting and baking. Conveyors take the parts through these operations and then to the shipping department. *(Photo courtesy Logan Co., Louisville, Ky.)*

being used extensively for overhead conveyors to provide their ability to side flex (see Figs. 1 and 2.) Trolleys and carrier hooks are connected directly to this chain; or bars, lugs, and braces may be bolted or welded to the chain in order that it may push the trolley. Used in much the same way as the Rivetless Chain—but not as extensively—is the Long-Pitch Leaf or Ice Chain.

The Roller Chain is probably the best known, being utilized in literally thousands of applications. In smaller sizes it is ideally suited for power transmission and is therefore used extensively for conveyor drives. It is, however, also used with overhead conveyors and to a great extent in paired chain applications (see Figs. 6 and 7).

The Pintle Chain (Fig. 3) is a fourth type of chain that is used as a part of

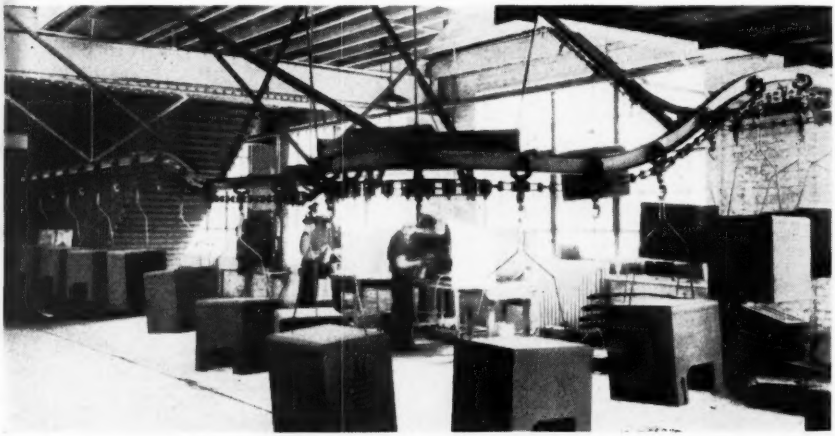


Fig. 1—Housings for stoker hoppers travel from drying oven on second floor to inspection department on floor below. The conveyor, 400 feet long, is made of Link-Belt No. 458 Rivetless Chain with carrying hooks spaced every 24 inches. *(Photo courtesy Link-Belt Co., Chicago 1, Ill.)*

various types of conveyors. Available in several series to fulfill various strength requirements, the design has the inherent advantage of being easily assembled to cross-bars to form a two-strand conveyor. It is also used for monorail conveyors for conveying small parts or light loads.

Cast Roller Chain is much like the pintle chain but has this major difference—there is a roller where the links join. Therefore, this chain can be used whenever there is an angle iron or beam upon which the chain can roll. As a result, the Cast Roller Chain has been widely adapted to the table top or apron conveyor and in automatic equipment (see Fig. 4).

There are many other types of chains such as table top chains, block chains, and so forth. In general, the chains are made of malleable cast iron, steel, or special alloys such as Rex Z-metal. They are heat treated to meet special strength or wear resistance applications, galvanized, cadmium, or zinc plated to meet high corrosion resistance requirements.

Although these various types of chains are used, with few exceptions,

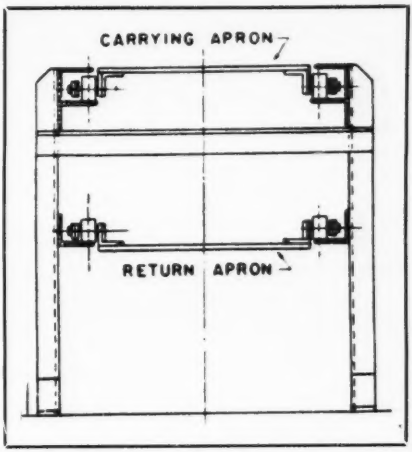



Fig. 4—Cross-sectional view of a steel apron conveyor.
*(Illustration courtesy the Alvey-Ferguson Co., Cincinnati 9, Ohio)*

in all conveyors and might therefore be classified in these categories, a better method of separating them is perhaps to group them according to their location, such as floor conveyors, table or table-top conveyors, and machinery conveyors.

### Floor Conveyors

For finishing cars, prefabricated houses, or other large objects, some form of a drag chain conveyor, usually with one large chain, is employed. In Fig. 5 a large pitch, heavy, single-strand drag chain is shown being used for moving trucks through an infra-red drying oven. By turning the

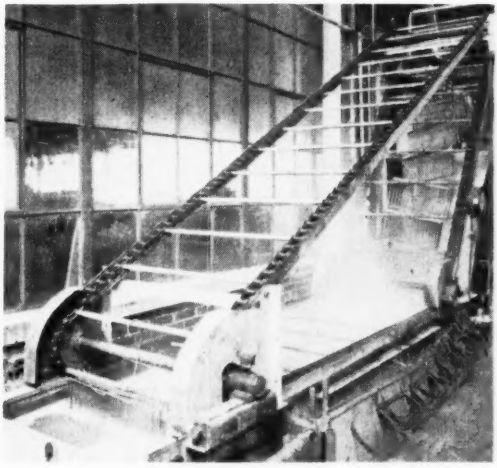


Fig. 3—Two strands of Pintle Chain are used to form a conveyor for automatic cleaning and drying of wire shelves.
*(Photo courtesy Link-Belt Co., Chicago 1, Ill.)*

chain on end, this conveyor can make turns in the horizontal and vertical direction. By installing the chain in the center of tracks, it can pull any desired type of vehicle, trolley, jig, or fixture which can move on these tracks. The trolleys are built so that they may bring the work to the workman at the desired height; yet the moving conveyor chain is still at floor level. By using two strands of chain running parallel and connecting them with wooden or steel flights, a broad conveyor is formed which can be applied to finishing and final assembly operations of such items as stoves or refrigerators.

### Table or Table-Top Conveyors

Table conveyors may be sub-divided into two classes; those made up with chains, and those made of a woven wire belt.

Frames for these conveyors are usually made of angle iron, assembly welded. If a single chain is used, the conveyor may be straight-line, circular, or any other curved shape required; when two chains are employed, the conveyor is usually straight. With a single strand, the work-carriers, which may be of special design to fit the product handled, are fastened to the chain. The carriers have cast iron or steel dollies at each side which ride on I-beam or angle-iron tracks. When two chains are used, the wheels are an integral part of the chain and ride on angle irons of the frame. Wood or steel slats are mounted above the rollers, and slats are of such width, and rollers at such centers, so that a continuous surface is formed which is the moving top.

In the preceding discussion, relatively large

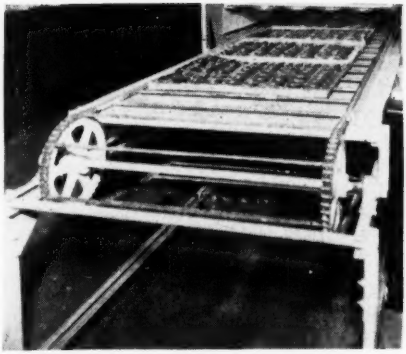


Fig. 6—Auto emblems move through an infra-red heat zone at the rate of 15,000/8-hour day on this bar-type conveyor.
*(Photo courtesy Jensen Specialties, Inc., Detroit, Mich.)*

Fig. 5—A single-strand drag chain conveyor pulls Studebaker trucks through an infra-red oven.
*(Photo courtesy Anchor Steel and Conveyor Co., Dearborn, Mich.)*

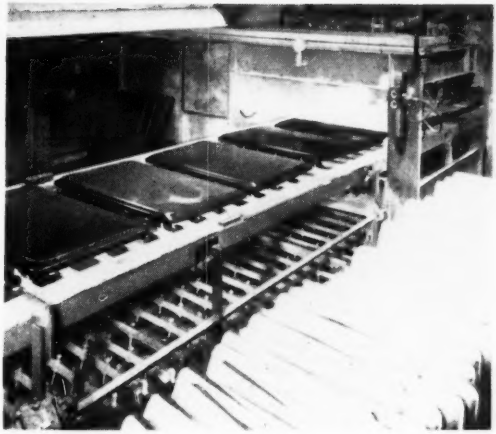


Fig. 7—Pin-type conveyor transports ground coated panels through low-pressure, automatic spray machine which applies porcelain enamel finish coat.
*(Photo courtesy DeVilbiss Co., Toledo 1, Ohio)*

and heavy types of link chain were considered. However, many applications are suitable for the lighter roller chain. Small objects, light load, and short travel distances usually require that some type of roller chain be designated. A Jensen-designed "Bar Type" flat top conveyor (see Fig. 6) is used by the D. L. Auld Co., Columbus, Ohio, to convey hub caps and refrigerator name plates under infra-red lamps. This type of conveyor can be obtained in virtually any width and length.

A different application of the single-strand roller chain conveyor is illustrated by the Plate Top Conveyor, where small plates of various designs are attached to the chain links. Such a conveyor is widely used for conveying small objects in many other industries, and the finisher of small parts should not overlook this type of conveyor. Latest developments have made it flexible in the horizontal and vertical plane and allow easy, automatic transfer from one conveyor to the next. Many conveyors of this type do not employ a true roller chain, but utilize various different kinds of links, designed to provide smooth application of power through the drive sprocket, and easy traveling motion. Actual ap-

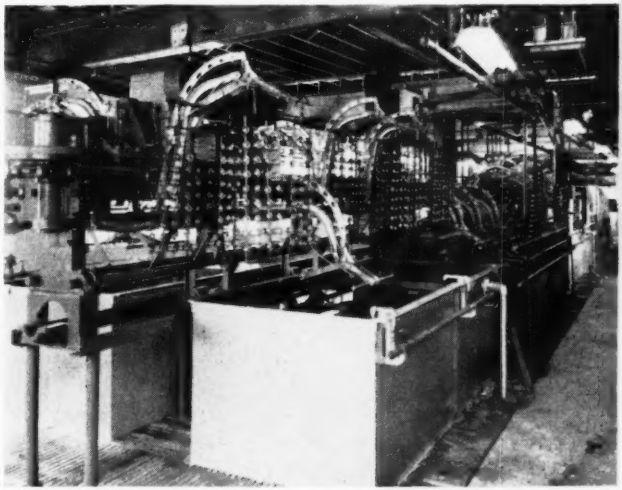


Fig. 8 — A conveyor chain, to which are attached carrier arms, transports parts through the plating process in this Stevens Model B full automatic plating machine.
*(Photo courtesy Frederic B. Stevens, Inc., Detroit 16, Mich.)*

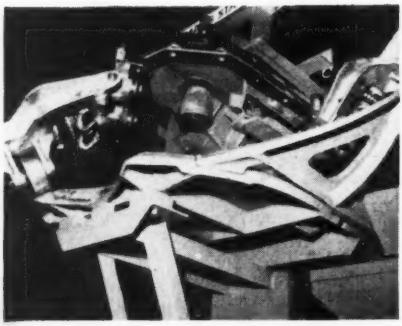


Fig. 9—Close-up of a large pitch roller chain used on the Stevens Super E Plating Machine. The chain has a 6-inch pitch, and is heat treated.
*(PRODUCTS FINISHING Staff Photo)*

plications of the various types of conveyors are limited only by the ingenuity of the plant or design engineer.

**Conveyors in Finishing Machines**

Single or double-strand chain conveyors and woven wire belt conveyors are found in almost all small parts finishing equipment and in much equipment designed for medium sized work. Whether the equipment be an automatic or semi-automatic plating machine, an automatic spray painting unit, a cleaning unit, or an oven, conveyors are necessary to achieve the type of operation that saves man-hours, increases productivity, and raises overall efficiency—in short—to make it automatic!

Figure 7 shows a pin-type conveyor used for carrying steel parts through a porcelain enameling installation in which an acid-resisting enamel is applied over the ground coat. The conveyor transports the parts through spraying and drying operations. As it returns, it dips through a shallow sump to wash pins free from excess porcelain enamel, a good example of the versatility that is available to the process engineer in a conveyor system. The chain in this conveyor is of the cast roller type and rides in channel and angle-iron bars.

Other types of conveyors that are also applied to flat work spray painting are the bar and woven wire belt conveyors. Each has its own applications depending upon the weight, size, and type of metal to be processed; temperatures and chemicals to be encountered; and other factors, such as speed, capacity, and so forth.

Conveyors and conveyor chains are

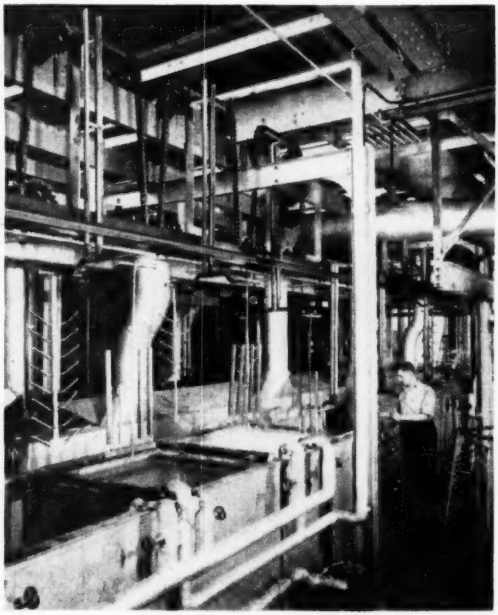


Fig. 10—An installation of the Meaker Automatic Plating Machine in a plumbing fixture manufacturing plant.
*(Photo courtesy Link-Belt Co., Chicago 1, Ill.)*

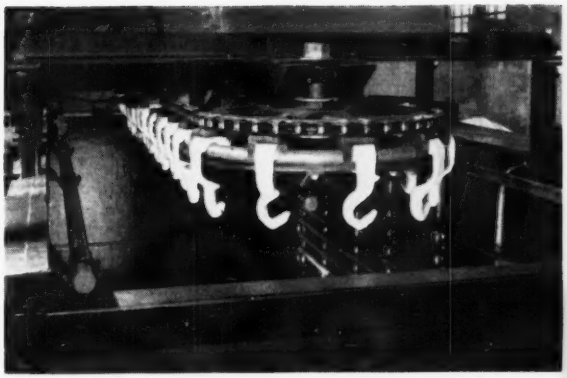


Fig. 12—A non-standard 2-inch pitch roller chain is used as the conveying medium in a Udylite Semi-Automatic Plating Machine. *(Photo courtesy The Udylite Corp., Detroit 11, Mich.)*

also being widely used in plating operations and machines. Figures 8 and 9 show their application to automatic plating machines. The conveying medium on the plating machine is a large pitch, hardened, roller chain.

In the return-type full-automatic plating machine illustrated in Fig. 10, conveyor chains carry the work up and down as well as forward. In this machine, a horizontal-plane main conveyor operates in a steel channel, and roller chain transfer loops lift the plating racks up and out of tanks, over the top, and down into the next tank (see Fig. 11). The transfer loops operate independently of the main chain but are synchronized with it so that, as the work being plated slowly approaches the end of a tank, a knob on the transfer loop chain will automatically lift the plating rack and transfer it from one tank to the next. Movement of the carrier racks from one transfer loop to the next is attained through pusher pins which are fitted on the main conveyor at definite intervals.

Roller chain is also used extensively in various other plating machines. Figure 12 is a close-up view of the traveler chain used on one type of semi-automatic plater. The chain is No. 702 non-standard, 2-inch pitch, hollow studded, and has an ulti-

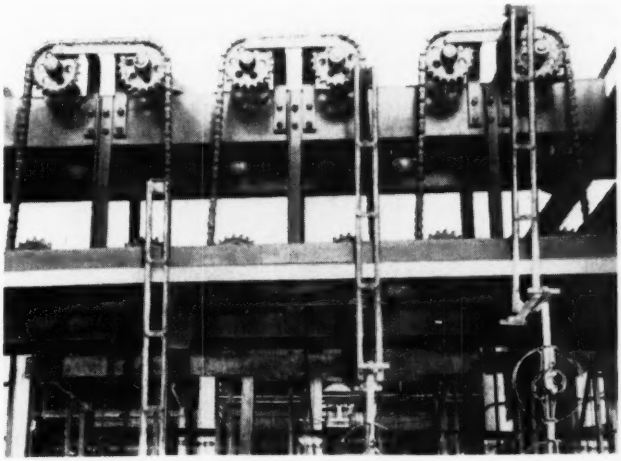


Fig. 11—In this application of roller chain in a plating machine the first carrier, at left, is approaching the horizontal channel which encloses the main conveyor; the second carrier, center, has just started its downward motion, that is, the part is about to enter a tank; the third carrier, right, is at the top of the loop being carried across the end of the tank. *(Photo courtesy Link-Belt Co., Chicago 1, Ill.)*

Fig. 13—A view of an Alvey-Ferguson Automatic Washing Machine. Steel roller side chains are 3-inch pitch; the belt is spiral woven and reinforced with through rods.
*(PRODUCTS FINISHING Staff Photo)*

mate strength of 54,000 pounds and an approximate working load of 5,400 pounds.

A third application of chain conveyors is in the field of industrial washing and degreasing machines. It should be pointed out that any of the overhead conveyors discussed in Part I can be used in cleaning machines provided, of course, that the chemicals used are not harmful to the mechanical equipment, or the equipment has been properly processed for protection. While the overhead conveyor is used for large or medium sized work, small parts are generally cleaned and/or phosphatized in machines that use baskets, flight bars, wire mesh, or link mesh conveyors (see Fig. 13). These compact units are built to meet individual plant requirements, but are also made as standard units. Speed and width of belts vary with the job for which they are intended. One manufacturer employs a speed range between 2 and 10 or 12 f.p.m. and a belt width range from 18 to 42 inches.

An interesting example of a broad roller chain in cleaning equipment is a conveyor belt designed primarily for heavy duty in the automotive industry. The belt is made up of 3-inch pitch roller chain, one on each side, and cross bars spaced at approximately 3-inch centers. Dimensions of the cross bars vary with the weight of the product for which the unit is designed, in this case being approximately $\frac{3}{8}$-inch wide by 1-inch thick.

For light parts, a wire mesh belt conveyor can be used to good advantage. However, where loads are somewhat heavier, the link mesh conveyor is recommended in place of the wire

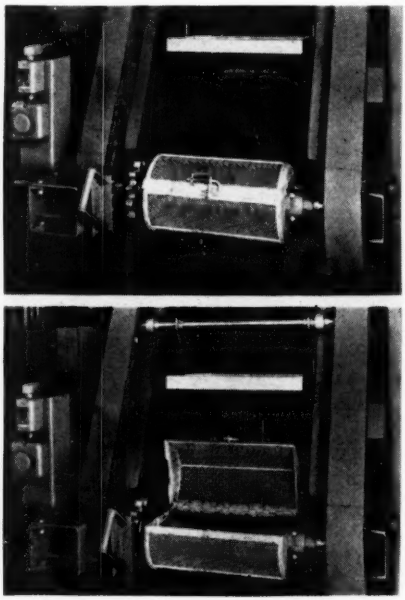


Fig. 14—In this automatic degreasing machine large rollers on the cross rods allow the chain to make the horizontal run without any drag or excess wear.
*(Photo courtesy G. S. Blakeslee & Co., Chicago 50, Ill.)*

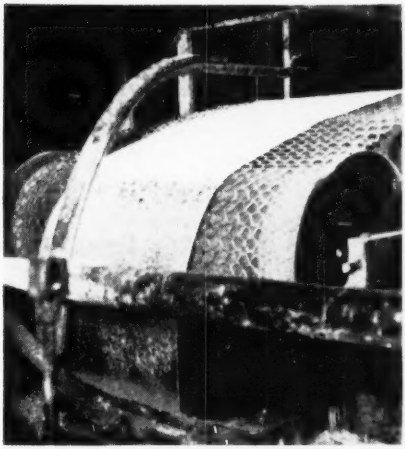


Fig. 15—A balanced wire belt delivers galvanized sheet from the galvanizing pot. *(Photo courtesy Cambridge Wire Cloth Co., Cambridge 11, Md.)*

mesh type. Link mesh conveyors are made with steel roller side chains and cross rods similar to the wire mesh conveyor. In place of a wire mesh belt, space between side chains is filled in with a series of rectangular assemblies, which consist of vertical steel links fastened to tubular spacers. The result is a very sturdy conveyor that offers considerably less resistance to a lower wash spray. The tubular spacers act as bearings to prevent the vertical links from cutting into the cross rods as the conveyor passes around the various sprockets.

Special pallet or fixture-type conveyors are indicated when pieces require special handling. Regardless of the particular type used in washing machines, conveyors are usually equipped with a spring-loaded take-up to compensate for expansion and contraction of material due to temperature changes. Drives are by roller chain and many manufacturers design the drive through a shear pin hub, thus providing instantaneous protection against overloading or jamming in the moving parts.

Closely allied to cleaning is automatic degreasing, a process that would, in many cases, be impossible without conveyors, because of the toxic chemicals used. In degreasing very small parts or parts that require liquid im-

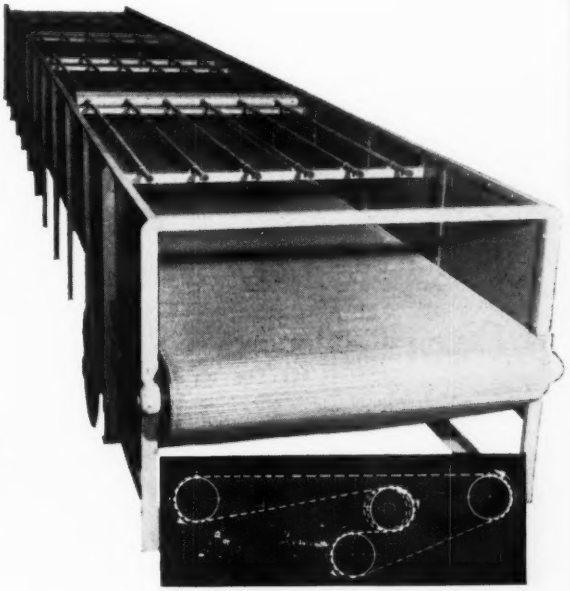


Fig. 16—A wire mesh conveyor belt is driven by a drive drum and is primarily used for light loads. The machine can be used for cleaning, painting, or baking metal parts. *(Photo courtesy Cincinnati Cleaning & Finishing Machinery Co., Cincinnati 2, Ohio)*

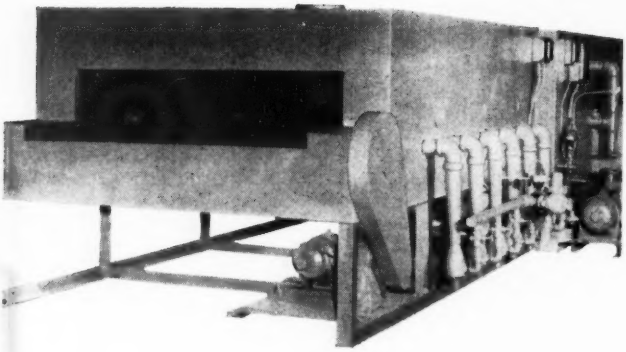


Fig. 17 — A strong wire mesh conveyor belt used for processing various types of refrigerator parts. Note roller chain and sprocket for positive drive on right side of machine.
*(Photo courtesy Cincinnati Cleaning & Finishing Machinery Co., Cincinnati 2, Ohio)*

mersion, cross-rod or basket-type conveyorized machines are generally used. Figure 14 shows an application of conveyor pintle chain in such a unit. In this degreaser, both flat and rotating baskets are mounted between the two strands of the chain on equally spaced cross rods. Power, which is supplied from a 1 h.p. motor, is transmitted by 3-inch pitch chains which are approximately 65 feet long.

In the illustration shown, baskets are designed to rotate in the degreaser so that the work can be gently tumbled and all residual solvent thereby drained from the work before it leaves the machine. In this manner, no liquid can be trapped in the parts, even if they are cup-shaped, and dragout loss is kept to a minimum.

### Woven Wire Mesh Conveyors

In cleaning, painting, and baking medium or small parts in a horizontal rather than a vertical position, the wire mesh conveyor has often been the answer to the handling and moving problem. Its application is not limited to automatic machines but it can be used in many installations where delicate handling of parts is required.

Wire mesh or link mesh conveyors range from very fine to very coarse and may be obtained in various metals, such as steel, Monel, aluminum, or phosphor bronze, depending upon their application in respect to surrounding conditions, such as temperature and corrosive atmosphere.

No one woven wire belt construction is applicable under all operating conditions. Consequently, over twelve different designs have been developed. All belts, however, are made up of one or two basic units, the left-hand spiral (counter-clockwise wound) and the right-hand spiral (clockwise wound). They are combined to form duplex belts, sectional belts, one-direction belts, interwoven belts, and many others (see Fig. 15).

In washing machines, wire mesh conveyors are used for those cleaning operations in which the load is not too heavy, and where size or shape of parts being processed might cause them to fall between flight bars. Mesh openings are selected on the basis of the particular conditions involved and the ability to maintain the least interference with a lower wash spray.

To prevent products being processed from falling over the side of the belt and still allow maximum mounting, the edge of the belt can be turned up to form an upturned fabric guard selvage. Other guards such as removable lug and cotter-type plate selvage and riveted plate selvage for heavy duty have been developed.

Two methods for moving these belts

are used; namely, friction and chain drive. In the former, the belt runs over broad pulleys or cylinders, as shown in Fig. 16, and with sufficient tension on the belt, motion is transmitted from the drive pulley to the belt. With the chain drive, two strands, one for each side, are necessary. Detachable chain, pintle chain, and roller chain are among the various types employed with wire belts, each differing somewhat in the manner in which they are fastened to the belt. The latter method does have the inherent advantage of providing a position drive (see Fig. 17). In this illustration through rods between the two roller chains of about $\frac{7}{16}$-inch diameter may be clearly seen. Also, since this belt has a large width, a center strand of roller chain as well as two side strands are used. Depending upon the size of the weave, the rods are threaded through the loops of the wire mesh. If the mesh is too small, the wire belt is fastened to the rods by other means.

Many progressive washing equipment innovations have appeared in recent years. One machine that is unique is a two-in-one unit in which two complete cleaning units are adjacent to each other in the same housing. Both use the same supply tanks and the same set of pumps. These units combine conveyors of different types in various ways to maximize productive capacity, efficiency, and economy in many parts-washing operations. For example, one machine contains two complete washing-rinsing-drying units. An overhead trolley conveyor in one unit cleans metal parts in a vertical position while a wire mesh conveyor in the other cleans parts in a horizontal position.

In another case, a unit houses a wire mesh conveyor in one section of the unit and a rotary-drum washer in the other. Small metal parts covered with cutting oil are conveyed to this "two-in-one" unit in metal boxes. Parts are cleaned in the rotary-drum side and the metal boxes in the wire mesh conveyer side. Both parts and boxes are thoroughly, quickly cleaned as they pass through the equipment, which is synchronized so that the box always comes out of the machine first, in time to receive the small parts upon

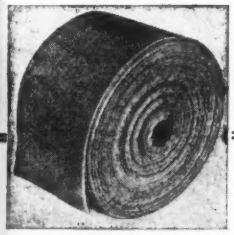
Fig. 18 — Emerging from the oven conveyor, drums move to the cooling conveyor. The drive system for the steel slat oven conveyor may be seen in the foreground; for the roller conveyor in the center; and the take-up sprocket for the cooling conveyor in the left rear.
*(Photo courtesy Conveyor Systems, Inc., Chicago, Ill.)*

their discharge from the rotary-drum section.

### Roller Conveyors

No survey of conveyors would be complete without mention of that old standby—the roller conveyor. Made by almost every company in the conveyor manufacturing field, it can be obtained to suit practically any installation or requirement. It is often installed at a slight pitch in the horizontal plane to allow the force of gravity to work and thus save power. It is also used as a power conveyor by the use of a canvas belt drive beneath the rollers. In the latter case, a set of pressure rolls is necessary to keep the belt against the load roller and a third set of rollers is needed for the belt return. Often "live" roller conveyors are used to change direction of flow or to tie other types of conveyors into one completely automatic system. For example, in one installation, steel drums leave a paint spray booth, are set upright by an "up-ender," and transferred by a "live" roller conveyor onto a steel slat conveyor which moves the drums through the drying oven. A "live roller conveyor" accomplishes right angle transfer and change of direction when the drums leave the drying oven (see Fig. 18). The roller conveyor transfers the drums to a steel slat conveyor which carries the drums to the shipping department while cooling.

Roller conveyors may also be adapted to cleaning machines. Such a case is illustrated by a special type stamping belt used to hold ordnance parts in exact position for complete cleaning and draining. Stampings are used to divide the belt into various sections which are designed to hold other components of the ordnance parts that make up the complete assembly. Thus, mating parts can be processed, while

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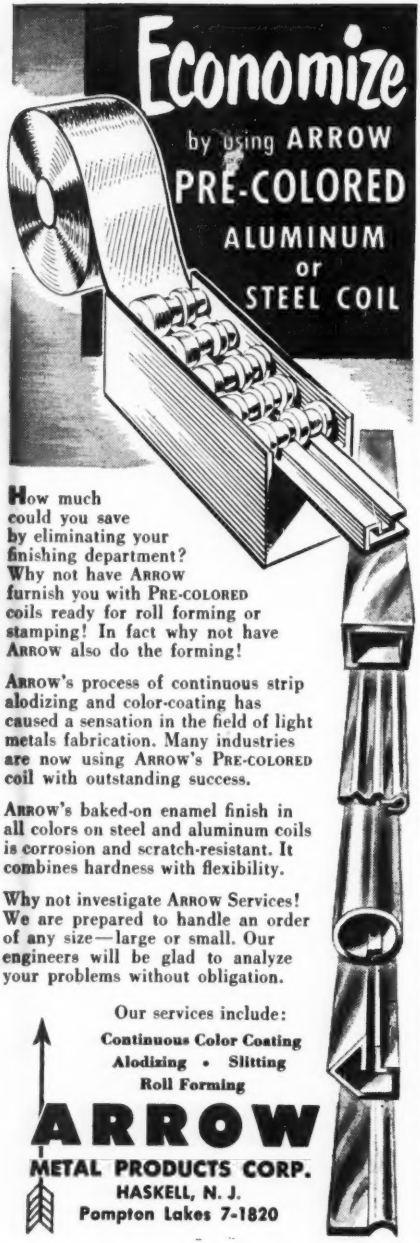


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apart, with no danger of a mix-up.

Today, rollers for roller conveyors are equipped with ball bearings and their contours may be tapered, parallel, or concave depending upon their usage. Standard units are manufactured and include straight sections, curves, switches, and Y's. They can be installed two or three tiers high, thus allowing a double pass through a process when so desired.

From the types of conveyors discussed, their characteristics, and from the few examples given, the many advantages of conveyorizing a process may be seen. The extreme flexibility of conveyors—limited only by the ingenuity of the process or design engineer—is an important consideration. Fast, controlled movement of parts through manufacturing and finishing stages of a process are the conveyor's trade mark.

Theoretically, there is no limit to the length of a conveyor line. It may conceivably start from the first manufacturing operation, include all subsequent operations of construction and all finishing processes such as cleaning, plating, drying, painting, and baking, and the final assembly line.

Conveyors achieve uninterrupted flow, bring the right quantities to the right place at the right time. They eliminate fatigue and promote higher production and efficiency. They are available for every process, every part, and are designed to meet every purse.


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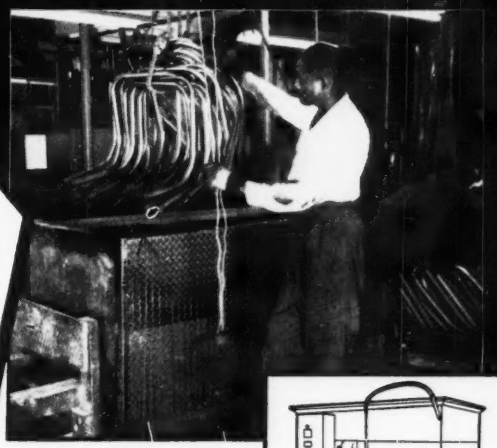

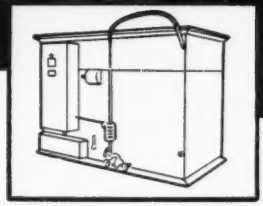

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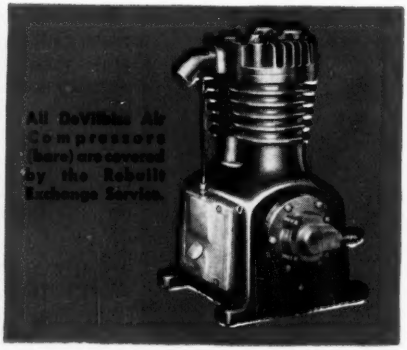

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# White Brass Plating

By W. B. KNIGHT
Knight Plating Company, Detroit, Michigan

IN view of present-day conditions, wherein we are constantly facing changing circumstances of supply and demand, aggravated further by governmental restrictions as to usage, it is absolutely essential that substitutes of metals be made available wherever possible. The quality, availability, and cost thereof are of prime importance. The first metal to practically disappear from our civilian economy was cadmium. We were not hit too hard by this, since zinc and phosphate coatings have so far been sufficient for replacement in most instances. Nickel and copper (when we mention the metal we also allude to their compounds) shortages are most serious in that so many platers and plating plants are dependent on these metals, even to the point of survival. Chromium plating is the major item in most plants and represents the greatest dollar volume of sales. Therefore, an all-out effort to find a satisfactory substitute for the nickel undercoating for chromium plating was made.

Many processes have been checked to determine their suitability as substitutes for nickel. Bright zinc, with or without conversion coatings, subsequently lacquered or waxed, has been used. Chromium plate direct on copper, subsequently laquered or waxed, can be used, but does not fulfill all the requirements for an alternate finish.

Knight Plating Company, in the fall of 1950, carefully checked over all the data available and adopted white brass as the most promising or feasible substitute for nickel. White brass was known probably 20 years ago, though it was not plated bright at that time. Testing was started and the first production unit was in operation in February or March of 1951. We have made considerable progress in the development of this plate over a period of months and anticipate greater improvement in the future.

It must be stressed that this is a developing plating technique, and no one concerned can give a complete answer. In other words, at present any one attempting to run white brass is greatly dependent on his own individual effort.

White brass plate has serious limitations but many advantages. At the present time it is limited to underplate for chromium, but we hope to be able to stabilize the surface to make it satisfactory with or without chromium plate.

Essentially white brass involves a cyanide type of plating solution with certain brighteners and addition agents, plus anodes containing 80 per cent zinc and 20 per cent copper. Variations can be made to obtain desired results. Chromium can be plated on white brass very readily with good coverage, or good throwing power. The optimum thickness at present is approximately 0.0002 inch minimum, 0.0003 inch maximum. We plate direct to base metal. This eliminates nickel entirely, as well as the copper undercoat usually deposited under nickel plate. However, in certain circumstances this copper coating may be

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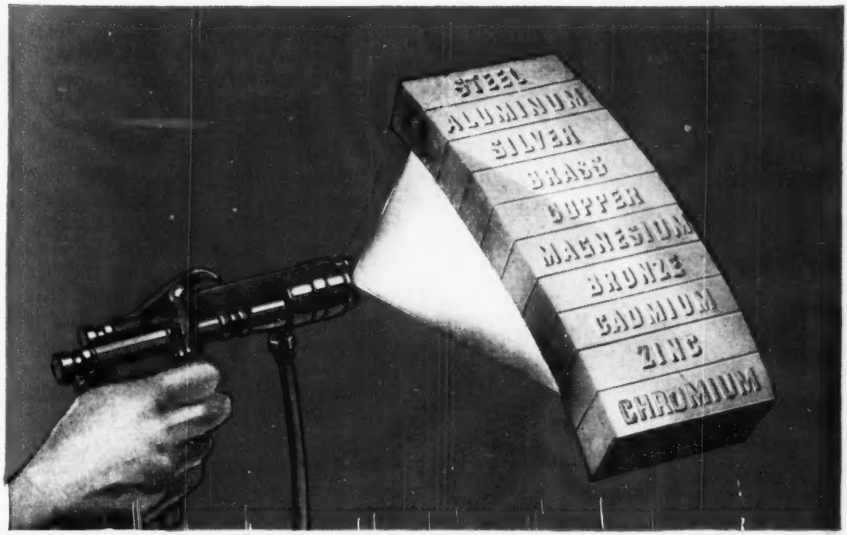
required. Very close laboratory and operational control is an absolute must. White brass withstands salt spray very well insofar as red rust on steel is concerned, and more investigation must be made regarding white corrosion products. Wiping off this white film restores the appearance of the surface as long as the chromium plate endures. Opinion exists that salt spray is not the medium of evaluation that should be used, and does not altogether determine the qualites of this plate; however, it is the measuring stick we have been using. There are a number of problems yet to be solved, but there is great confidence that these are not insurmountable, and that there is a bright future for white brass as an undercoat for chromium plate.

The following is an interim report on the work we did prior to November 26, 1951, on still tank plating on white brass. We would like to point out, at this time, that we are not able as yet to draw any final conclusions from our work. The opinions voiced herein may be changed in light of some future developments. However, we are daily progressing to what we believe will be a successful project. Before we summarize the work done thus far, we wish to first reestablish the purpose of this program, and second, to indicate some of the results we hope to obtain.

The purpose of this program is to develop a practical method for the deposition of white brass from a tank solution. The practicability is to be judged as to its success or failure by the following criteria:

1. The plate must be uniformly bright.
2. It must provide a good base upon which to plate chromium.
3. A combination of white brass and chrome plate must stand baking without cracking.

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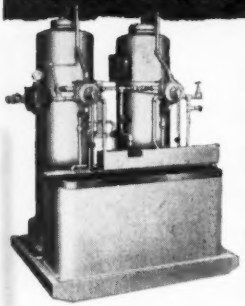

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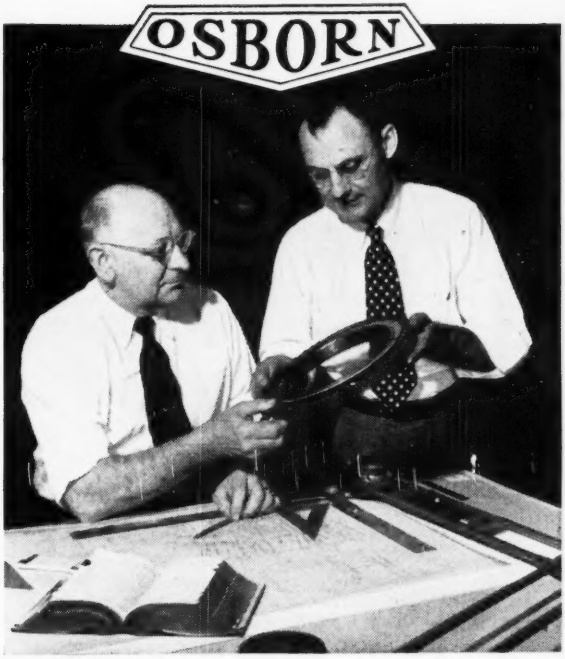
4. The final plated article must give adequate protection against corrosion.

Our previous work with barrel white brass solutions helped immeasurably in indicating the type of solution which would most likely be successful in a still plating tank. The original solution showed certain characteristics typical of still tank white brass solutions used throughout the industry at this time. The plate had a tendency to be extremely brittle, anode corrosion was poor, and the bright plating range of the solution was very narrow. An effort was made to correct these difficulties by adjusting the chemistry of the bath, with little results. Solution agitation was tried with varying degrees of success. As might be suspected, agitation did extend the bright range somewhat. However, it did little to eliminate the brittleness. In fact, if the agitation is too severe it apparently increases the tendency toward brittleness. It was at this point that we turned our efforts toward finding a secondary brightener. We hoped to find a compound that would increase the bright range, promote anode corrosion, and result in some grain refinement of the alloy plate. This last, it was hoped, would result in a less brittle plate. Several different compounds were tried. One in particular has shown very promising results. It not only seems to fill the qualifications we are looking for, but in addition it seems to stabilize the white brass plate. It retards the tarnishing usually associated with white brass.

Finally, we would like to discuss the importance of the chromium plate deposited over the white brass insofar as the corrosion resistance of the final product is concerned. In our work, over the past year, with barrel white brass and chrome, it has always been apparent that the quality of the chrome plate determined to a large extent the

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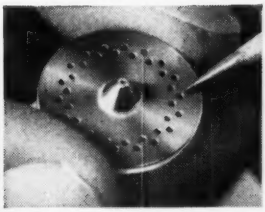

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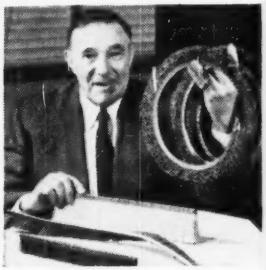

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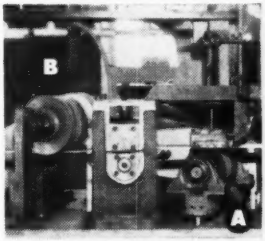


**IT'S AUTOMATIC.** This machine, developed with the help of the **O**sborn **B**rushing **A**nalyst, cleans steel-backed, babbitt-lined strip for production of automotive sleeve bearings. With the strip traveling continuously, Osborn Master® Wheel Brushes (A) remove all dirt, rust and metal particles from the steel surface. Osborn Monarch® Sections (B) then thoroughly clean the babbitt side. Perhaps a similar brushing method can help improve *your* production . . . *at the push of a button.*

value of the total plate. All our earlier discussions have indicated the tremendous value of a crack-free chrome plate, if such was available. By crack-free we refer to one free of the network of fine cracks always associated with chromium plate. There is a real possibility that we may be able to produce such a chrome plate. If this is accomplished, the salt spray resistance of white brass and chrome will be greatly increased. It is our intention to include this in our white brass project and to start work on a crack-free chrome as soon as possible. This cracking does not appear in our bulk plating process.

I was queried about our equipment, and will say that we converted our nickel platers to white brass. These were built and/or modified by us to produce heavy nickel plate wherein the average load is 75 pounds whether nickel or white brass. In these the running time is about 15 minutes. We are also producing white brass in standard submerged plastic type barrels. Here the load is up to 200 pounds with plating time about 30 minutes. All tanks should be lined. Temperature is what we term as warm, approximately 100 degrees Fahrenheit. We have approximately 4,000 gallons of white brass solution in operation at the present time, and during the period of June-November 1951 plated white brass and chrome on screws, 80 million pieces of which are in service.

*(Adapted for PRODUCTS FINISHING from a paper presented before the Boston Branch of the American Electroplaters' Society)*


IS YOUR PROBLEM
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What causes colors to vary in "size" and "distance" from the eyes? The Color Research Laboratory of Sun Chemical Corporation, New York, has made extensive studies of the dimensions of colors in an effort to solve some of the mysteries of color.

Because the focus of the human eye is not the same for all colors, the hues of the spectrum appear near or far, large or small. Red, for example, focuses normally at a point behind the retina. Conversely, blue is focused normally at a point in front of the retina.

Red, orange, and yellow usually form a sharp and clear image on the retina—even through distance and haze—while blue and violet tend to appear blurred. Yellow is apparently the "largest" color, then next in order are white, red, green, blue, with black the smallest of all colors.

A bright image also tends to "spread out" over the retina, just as a drop of water will creep over the fibers of blotting paper. Thus, bright colors appear large, and warm colors appear near.

Bigness is to be accentuated through the use of light, warm colors. Elements in design meant to stand out prominently should be red, orange, and yellow—and be set off against greenish, bluish, or purplish backgrounds of low value.

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# Clear Metal Lacquers

*Maximum Adhesion to*

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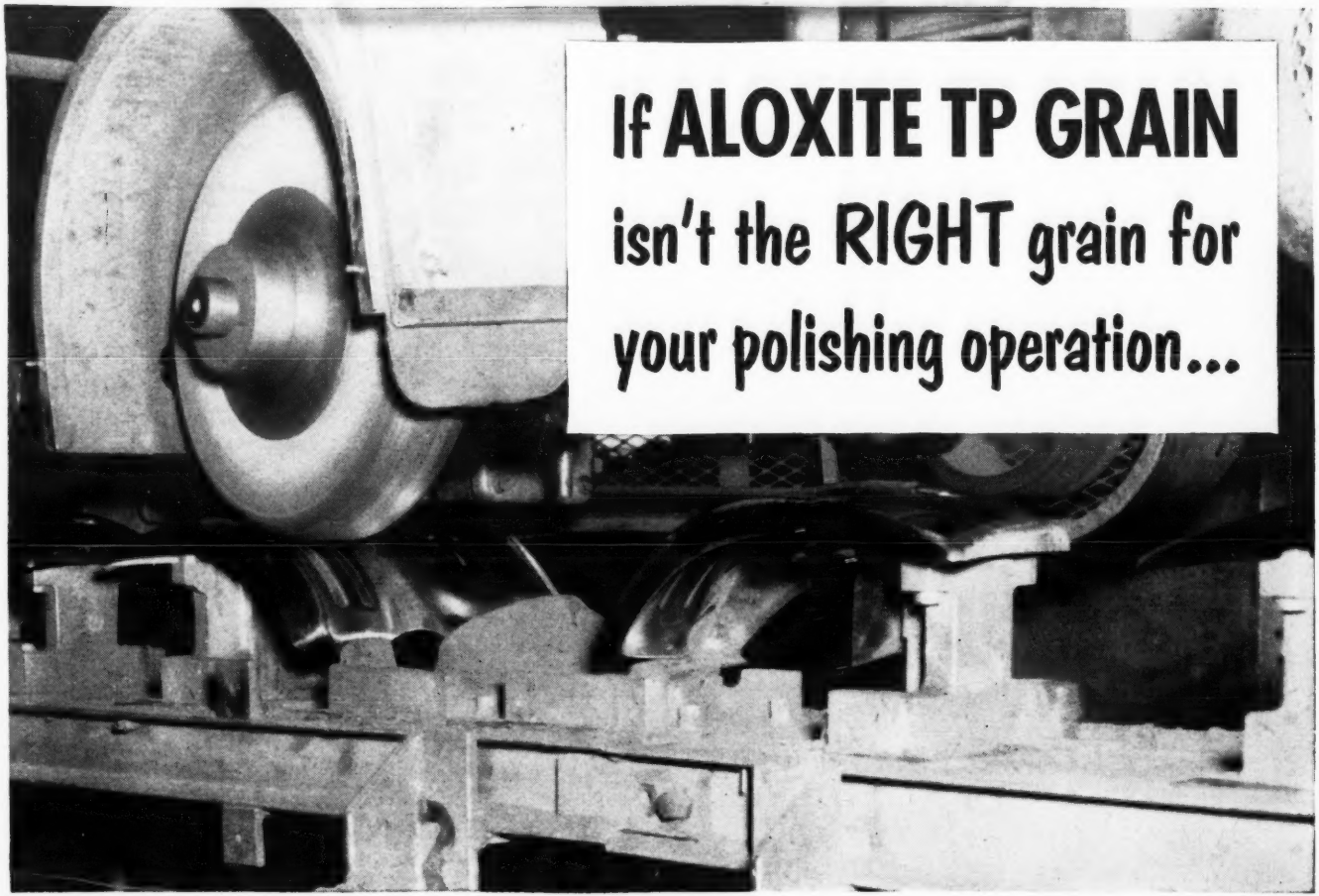
If ALOXITE TP GRAIN
isn't the RIGHT grain for
your polishing operation...

## ...then the right one is among the other six in the complete line by CARBORUNDUM

**ALOXITE TP GRAIN** is just one of the outstanding grain types in the most complete line available to industry. It's a tough, blocky aluminum oxide grain—ideal for polishing operations involving heavy stock removal on steel and other high-tensile-strength metals. If that's your problem, ALOXITE TP *is right* for you!

| GRAIN TYPE | CHARACTERISTICS | PRIMARY USES |
|---|---|---|
| ALOXITE TPT<br>Aluminum Oxide | Tough, sharp.<br>Grits 16 through 100. | Polishing operations involving removal of large amounts of metal. |
| ALOXITE TPL<br>Aluminum Oxide | Very sharp, friable.<br>Grits 16 through 220. | Polishing low tensile strength metals—copper, brass, bronze, aluminum. |
| ALOXITE TPC<br>Aluminum Oxide | Medium sharp.<br>Grits 16 through 220. | General purpose polishing grain—for removal of small amounts of metal. |
| ALOXITE TPW<br>Aluminum Oxide | Powder.<br>Grits 240 through 1000. | As the abrasive in paste heading of polishing wheels and belts. |
| CARBORUNDUM RA<br>Silicon Carbide | Sharp, very friable.<br>Grits 10 through 240. | Polishing cast iron. |
| CARBORUNDUM RA<br>Silicon Carbide | Powder.<br>Grits 280 through 600. | General purpose polishing. |

**FOR FREE BOOKLET,** "Abrasive Grain and Powders," write to Dept. PF 83-52.

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## offers ALL abrasive products...to give you the proper ONE

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# Spotlighting FINISHING Progress

## How Alkaline Cleaners Affect Magnesium Die Castings

ALKALINE electrolytes comprise an important class of metal cleaners. They have the property of removing many types of dirt but they must be used under conditions which do not severely attack the basis metal. This factor generally has a great deal to do with the choice, as well as operating conditions for the use of alkaline cleaners. In a paper before the 100th Electrochemical Society Meeting, J. F. Hazel, University of Pennsylvania, and Wm. Stericker, Philadelphia Quartz Company, gave the results of a study made to determine the effect of various alkaline electrolytes on a magnesium alloy of the die castings class. Weight changes experienced by the metal in both immersion and electrolytic cleaning baths of different compositions were determined during the course of these experiments.

An important step in the surface processing of magnesium alloys is cleaning. The effectiveness of subsequent surface conversion coatings and paints depends to a marked extent upon the removal of surface contamination by proper cleaning methods. Cleaning is required prior to conditioning magnesium for plating.

The magnesium die casting alloy used in the cleaning studies conducted by Hazel and Stericker was furnished by the Dow Chemical Company and was the A.S.T.M. designation

By DR. ALLEN G. GRAY

A Monthly Digest of Current Technical Progress Indicating Significant Trends and Developments in the Finishing Industry

## Want a fine pre-plating finish?

• You get it quickly with LIGHTNING® METALITE Cloth Belts. A minimum of polishing is enough, because there are no wheel marks nor wild grain scratches to buff out. These abrasive grains are electro-coated sharp-end-up in a DURABONDED® coating. This ideal combination resists glazing, shedding, and loading. It's all fine cut and no rub with this belt.

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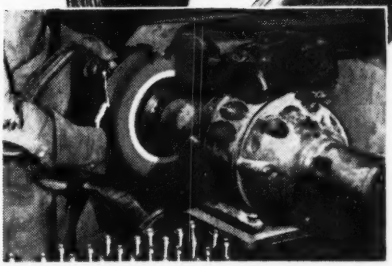

## Want to polish contours?

• Nothing is so adaptable as a belt when it comes to polishing short or long radius curves, rounds, recessed contours. With the right contact wheel the belt will hug the work and deliver the smooth continuous polished surface that you want. There have been surprising developments in application of LIGHTNING METALITE Cloth Belts, especially in the polishing of inside contours, that may be of value in your work. Your BEHR-MANNING Field Engineer has the data and will be glad to assist you in your production. Address Dept. PF5.

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**Table I**

WEIGHT CHANGES OF MAGNESIUM ALLOY IN VARIOUS AQUEOUS SOLUTIONS

Immersion time 60 min. Temp. 194 deg. F., Panel area 40 cm.

| SOLUTION TESTED | WEIGHT CHANGE grams |
|---|---|
| Distilled water | + 0.0009 |
| Tap water | + 0.0104 |
| Metasilicate, 0.885% $Na_2O$ | + 0.0003 |
| 0.7% Caustic soda | + 0.0003 |
| Silicious silicate*, 0.885% $Na_2O$ | + 0.0012 |
| Silicious silicate*, 0.582% $Na_2O$ | + 0.0055 |
| 3% Trisodium phosphate ($Na_3PO_4 \cdot 12H_2O$) | + 0.0002 |
| 3% Sodium carbonate ($Na_2CO_3$) | + 0.0009 |
| 3% Tetrasodium pyrophosphate ($Na_4P_2O_7 \cdot 10H_2O$) | — 0.0960 |
| 3% Quadrafos** | — 0.0831 |
| 3% Calgon*** | — 0.1704 |
| 2.9% Tetrasodium pyrophosphate plus 0.1% metasilicate | — 0.0463 |
| 2.5% Tetrasodium pyrophosphate plus 0.5% metasilicate | — 0.0005 |
| 0.6% Tetrasodium pyrophosphate plus 2.4% metasilicate | + 0.0006 |

*Solution of silicious silicate, 8.9% $Na_2O$; 28.7% $SiO_2$, 62.4% $H_2O$.

**Rumford Chemical Works.

***Calgon, Inc.

Based on data presented by J. F. Hazel and W. Stericker before the 100th Electrochemical Society Meeting.

AZ91. This alloy has a composition, in addition to magnesium, of 8.3 to 9.7 per cent aluminum; 0.4 to 1.0 per cent zinc; a minimum of 0.13 per cent manganese; and maximum of 0.5 per cent silicon, 0.10 per cent copper, and 0.03 per cent nickel. The dull casting skin and all but the deeper cracks were removed by hand lapping with various grades of emery cloth. The dimensions of the panels used in the cleaning tests were 2.5 by 7 by 0.3 cm. The ratio of metal area to solution volume was 1.5 square decimeters to 1 liter, as recommended in the A.S.T.M. procedure. The experiments were conducted at 194 deg. F., generally without agitation.

### Cleaning Materials Tested

Sodium hydroxide, trisodium orthophosphate, tetrasodium pyrophosphate, crushed Calgon, Quadrafos, and several sodium silicates were used as cleaners in the tests. The changes in weight which occurred on immersion of the panels for 60 minutes in water and in solutions of various alkaline cleaners are given in Table I. Hazel and Stericker also conducted tests to determine how the alloy would behave in electrolytic cleaning. Panels of the alloy were used as electrodes in water and in solutions of various alkaline electrolytes. The electrodes were placed 2.5 cm. apart using a ratio of metal area to solution volume of 1.5 sq. dm./liter.

Data summarized in Table II illustrate the behavior of the magnesium alloy when treated as cathode and anode in the various cleaning baths. The experimenters pointed out that severe attack occurred when the metal was used as anode. This was manifest by discoloration and the eroded spongy appearance of the electrode. Protrud-

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# INDUSTRIAL FINISHING
## *Exposition of 1952*

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SEE EXHIBITS IN THESE FIELDS—Electroplating equipment and supplies, abrasives, organic finishes, materials handling apparatus, industrial coatings, chemical processes, adhesives, etc.

**JUNE 16-19, 1952**

**INTERNATIONAL AMPHITHEATRE, CHICAGO**

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**Table II**

WEIGHT LOSSES OF MAGNESIUM ALLOY FOLLOWING ANODIC AND CATHODIC TREATMENT IN ALKALINE CLEANING SOLUTIONS

Temp. 194 deg. F. — Electrode area 30 sq.cm.

| SOLUTION TESTED | CURRENT DENSITY Amp./sq.dm. | TIME Min. | WEIGHT CHANGES Grams ANODIC* | CATHODIC |
|---|---|---|---|---|
| Metasilicate, 0.885% $Na_2O$ | 0.4 | 10 | — 0.003 | 0.000 |
| Metalsilicate, 1.770% $Na_2O$ | 0.4 | 10 | .... | 0.000 |
| Disilicate solution** 0.885% $Na_2O$ | 0.4 | 10 | — 0.01 | 0.000 |
| Silicious silicate*** 0.885% $Na_2O$ | 0.4 | 10 | — 0.013 | 0.000 |
| Silicious silicate*** 1.770% ($Na_2O$ | 0.4 | 10 | .... | 0.001 |
| Metasilicate, 0.885% $Na_2O$ | 2.0 | 5 | .... | 0.000 |
| 3% Tetrasodium pyrophosphate | 0.4 | 5 | .... | — 0.014 |
| 3% Tetrasodium pyrophosphate | 2.0 | 5 | .... | — 0.008 |
| 3% Total (20% pyrophosphate plus 80% metasilicate) | 1.0 | 5 | .... | 0.000 |
| 3% Total (20% pyrophosphate plus 80% metasilicate) | 4.0 | 5 | .... | 0.000 |

*It was reported that in many cases severe attack occurred when the metal was treated anodically.

**Solution of disilicate, 18% $Na_2O$, 36% $SiO_2$, 46% $H_2O$.

***Composition same as in Table I.

Based on data presented by J. F. Hazel and W. Stericker before the 100th Electrochemical Society Meeting.

ing, silicious deposits were formed with the more silicious silicates. Pyrophosphate caused erosion and severe darkening. The tests showed that magnesium retained essential constancy of weight when cleaned as cathode, except when a sequestering agent was present. No visible change was produced in the cathode when strongly alkaline cleaners were used. Sodium hydroxide, sodium orthosilicate, sodium sesquisilicate, and sodium metasilicate were investigated. The more silicious silicates caused darkening at the water line. Pyrophosphates alone caused severe darkening but, when mixed with metasilicate, the attack was eliminated.

In electrolytic cleaning the work sometimes is given a brief anodic treatment after the cathodic cleaning. Tests were conducted with magnesium to simulate these conditions. Panels were tested as cathode for 5 minutes, and then as anode for from 10 to 30 seconds. They were weighed before and after treatment but the weight change was found to be small. However, there was some darkening of panels, particularly with those specimens which were given as much as a 30-second anodic treatment.

Ferrous hydroxide precipitates at a pH of about 5 and like magnesium hydroxide it does not dissolve in alkaline solutions or react with excess hydroxyl ions. Strongly alkaline electrolytes are thus used for cleaning magnesium and iron. In most cases, so called heavy duty cleaners such as are specified for cleaning steel are recommended for cleaning magnesium.

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HOT Lacquer NEWS

PUBLISHED PERIODICALLY BY HERCULES POWDER COMPANY IN THE INTERESTS OF BETTER FINISHES AND FINISHING

# New Ford Plant to Use Hot Lacquer For Finishing Army Tanks

***Hot-Spray Process Avoids Installation of Baking Ovens in Ford's Livonia, Mich., Assembly Plant***

The decision of Ford's Tank Division to use hot-spray lacquer exclusively for finishing tanks at its new Livonia, Michigan, plant points up, once again, the advantages offered by this time-saving and money-saving process. This fast-drying system, developed by The Ordnance Corps., includes a new nitrocellulose base primer, MIL-P-11414 (ORD).

The enthusiastic switch to hot lacquer in defense and other industries stems from the following reasons:

- finishing time is cut by as much as 50%
- expensive baking equipment is unnecessary
- Every pass of the spray gun assures more solids . . . greater thickness
- fewer coats are needed
- less solvent is used
- coverage per gallon is increased
- finish has better flowout
- blushing is eliminated

***HERCULES POWDER COMPANY***
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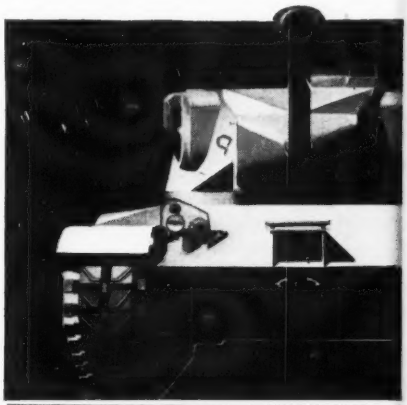
*Cellulose Products Department*
*927 Market St., Wilmington 99, Del.*



*You'll want to read about the broader uses of lacquer for finishing defense items —and your own products. New military specifications for lacquer and primer are now issued and official. Identified as "Military Specification MIL-L-11195 (ORD) Lacquer, Lustreless, Hot-Spray (For Ammunition)" and "MIL-P Primer, Lacquer, rust inhibiting." Hercules will send you full information on hot lacquer, types of heating equipment available, and the performance record of hot lacquer in many industries. Send for it today.*

CL52-2

Hercules does not make lacquers or components or own the formulas from which lacquers are made.

# *News about* UNICHROME

Trade Mark

## More production and fewer problems in hard chromium plating

Platers have found it easier to meet stepped-up production schedules with Unichrome S.R.H.S. Chromium. It speeds up plating time by 20 to 80%. It plates smoother, with less "treeing." This means less need for depositing excess chromium to allow for grinding and final finishing. With higher cathode efficiency, this chromium bath uses less power to deposit the specified chromium, thereby increasing capacity of existing equipment. It also assures top throwing power, minimized control and fewer rejects through its self-regulating feature.

## STEADY POWER FOR PLATING OR ANODIZING

Power supplies such as Unichrome Selenium Rectifiers offer you an "edge" today. You get units built to withstand plating room conditions, in sizes from 250 to 10,000 amperes, and you get them fast. In short, no need for long delay, or costly installation of more capacity than you can use, or frequent maintenance.

## Brilliant

## *Preventive maintenance saves replacement costs*

Today's shortage of metals makes replacement of equipment a serious problem. Many plating plants are, therefore, putting greater emphasis on preventive maintenance. They find that using chemical resisting Ucilon* Protective Coatings on a regular basis avoids corrosion damage to equipment and thereby minimizes not only the need for replacement but also the costly downtime. Applied to structural work, too, Ucilon Coatings keep plants looking better longer and save on yearly painting costs.

**Trade Mark*

# COATINGS for METALS

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# Zinc Finish with extra life

## in three easy steps

1. *Plating in zinc bath*
2. *Treatment in Unichrome Clear Dip*
3. *Application of an "invisible," clear enamel*

■ Combination finishes have come up as the answer for satisfactory bright finishing today—substituting for the plated finish which requires restricted nickel.

One such outstanding substitute is obtained by using only .0002″ to .0005″ of ordinary zinc plate and then following up by chemically treating the zinc in Unichrome Clear Dip. It is a fast, economical and easily controlled process, adaptable to manual or automatic operations. The results are startling. The plated steel or die cast product emerges from the solution bright as chromium. This Unichrome Dip Finish is integral with the zinc. It stays bright because of its good resistance to exposure, dulling, and finger-marking — thereby assuring for products not only the appeal of a bright plate but also great rust and corrosion resistance.

**A COMPLETE SYSTEM**

Application of a clear organic coating usually completes the finishing system. This final step is employed to assure the long service life expected of bright finishes.

A baked-on film of Unichrome Clear Coating B-115, for example, while virtually invisible, resists humidity, handling, discoloration and exposure. Where baking facilities are limited, Unichrome Coating A-140 is applied and then air dried or force dried to give results comparable in corrosion resistance to many coatings that are baked.

**PROVED IN SERVICE**

The combination of Unichrome Clear Dip and Unichrome Clear Enamel has been used with outstanding success for years on die castings, wire goods, ice skates, bicycle parts and other products and components. It proves that substitute finishes, properly fortified, can be durable and as attractive as the finishes replaced.

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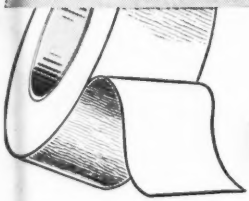

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INDUSTRIAL TAPE DIVISION
THE SEAMLESS RUBBER COMPANY
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It has been recommended that an average concentration of 6 to 8 oz./gal. of commercial cleaner held at a temperature of 180-190 deg. F., employing a 10 to 15 minute soak, followed by thorough rinsing be used. Aluminum, zinc, and tin, on the other hand, react with excess hydroxyl ions to produce soluble reaction products, and severe corrosion may result to varying degrees when these metals are treated with alkaline cleaners at a high pH.

Several conclusions may be drawn from the experiments conducted by Hazel and Stericker which are of practical significance to finishers dealing with magnesium cleaning problems. The tests showed that magnesium was not attacked by sodium hydroxide, sodium phosphate, and the more alkaline silicates, when treated cathodically. Severe attack occurred in all solutions where the magnesium was treated anodically. The magnesium-ion sequesterers, tetrasodium pyrophosphate, Calgon and Quadrafos caused marked weight losses.

### Cleaner Formulations

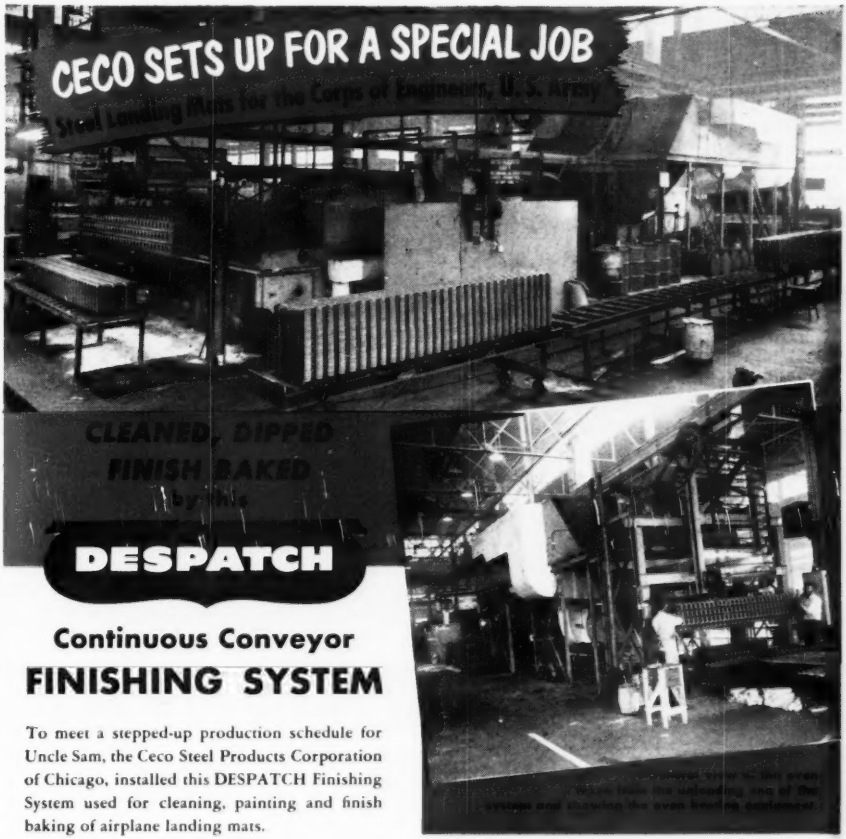
According to recommendations of the Dow Chemical Company, alkaline cleaners having a pH value above 11 give best results with magnesium. Many proprietary cleaners are available which will do a good job. A satisfactory cleaning bath suggested for use as a soak cleaner or as an electrolytic cleaner can be made up according to the following formula:

Trisodium phosphate _____4 oz./gal.
Sodium carbonate _____4 oz./gal.
Soap (or other suitable wetting agent) _____0.10 oz./gal.

The solution should be operated at 180-212 deg. F. Some form of agitation is desirable if the bath is operated below the boiling point. An immersion time of 5 to 15 minutes is usually satisfactory.

When the above bath is used as an electrolytic cleaner, it is generally op-

*to page 74→*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Steel Landing Mats for the Corps of Engineers, U. S. Army
CLEANED, DIPPED
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## Continuous Conveyor
# FINISHING SYSTEM

To meet a stepped-up production schedule for Uncle Sam, the Ceco Steel Products Corporation of Chicago, installed this DESPATCH Finishing System used for cleaning, painting and finish baking of airplane landing mats.

The system comprises a gas heated, 2-stage, dip cleaning unit with alkali wash and hot water rinse, a paint dip tank and single pass finish bake oven of bottom entry, "A" type design. The oven is gas-fired and operates at a maximum temperature of 350°F. Material is suspended from cross rods on a continuous conveyor, which returns to the loading zone over the top of the oven.

*Fifty Years' Experience*

## DESPATCH CAN HELP YOU BOOST PRODUCTION

Through 50 years of continuous research and on-the-job experience Despatch engineers have been accumulating facts and figures on how to give you better, higher producing finishing systems. Today, you benefit by these years of experience when you call on Despatch to help you. Despatch engineers will gladly analyze your requirements . . . will plan, select, coordinate and install complete Finishing Systems or individual units.

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FIFTIETH ANNIVERSARY

**DESPATCH OVEN COMPANY**

# birthplace of progress

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And the everyday tools of the businessman ... telephones, furniture, typewriters, calculators, files, ashtrays, etc., even the screws that hold them together, depend upon precision plating and anodizing for their sparkling appearance as well as lasting efficiency.

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***AND WHAT IS PLATEMANSHIP...*** *It is H-VW-M's unique combination of: the most modern and complete laboratory for testing and development ... the ability to provide complete equipment and supplies for every plating and polishing need ... the complete background of knowledge and experience in every aspect of plating, polishing, cleaning and anodizing.*

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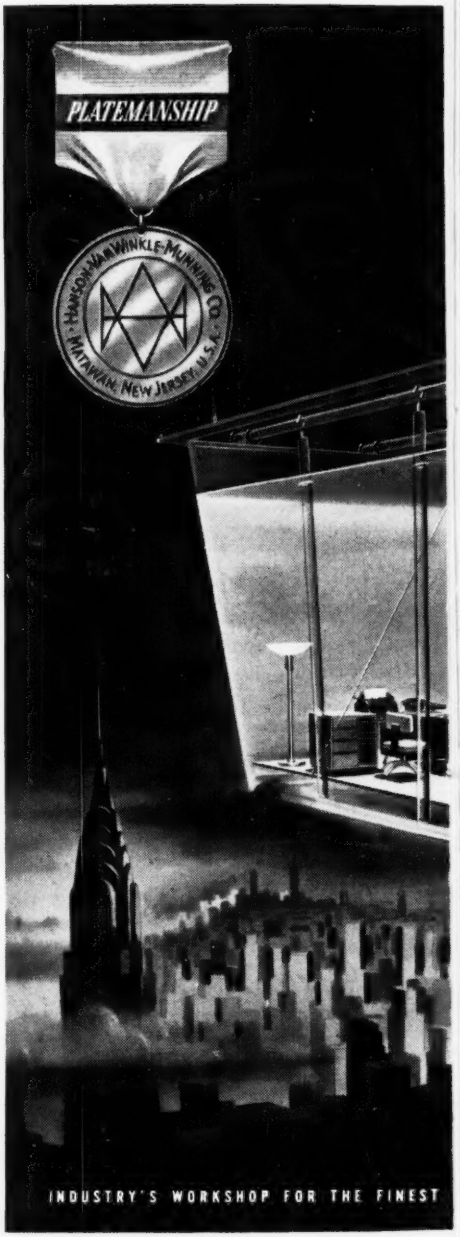

IN PLATING AND POLISHING PROCESSES • EQUIPMENT • SUPPLIES

erated in the range of 160-180 deg. F. In this case the soap should not be added. The work is made the cathode and a direct current of 10-20 amp./sq. ft. of cathode area is applied for 1-3 minutes. In some cases, a longer treatment time may be required. Rinsing after alkaline cleaning should be very thorough to avoid contamination of chemical treatment solutions which often follow the cleaning cycle. Steel tanks with suitable ventilation are satisfactory for the alkaline cleaning solutions. Where work is contaminated with oil and grease, as in the case of other metals, such contaminants should first be removed by means of solvent or vapor degreasing in order to prevent a build-up of oil and grease in the alkaline cleaner.

An alkaline cleaner made up of 2 oz./gal. caustic soda and 3 oz./gal. sodium carbonate has been suggested for use prior to chemical treatment of magnesium parts. It is useful when old chrome pickle or dichromate coatings are to be removed. The cleaning bath is operated at 190-212 deg. F.; immersion cleaning time ranges from 3 to 10 minutes. Cathodic cleaning requires less time than soak cleaning. Conditions used are current density of 10 to 40 amp./sq. ft. at 6 volts.

For alkaline cleaning magnesium prior to electroplating, the Dow Chemical Company has recommended soak cleaning for 3 to 5 min. in a bath containing 4 to 12 oz./gal. caustic soda and 4 oz./gal. trisodium phosphate, maintained at 180-212 deg. F. Cathodic cleaning for 30 seconds to 1 minute, at 20 to 40 amp./sq. ft., at the end of the soak cleaning period is optional, but preferable.

### Acid Cleaning

Acid cleaning of magnesium involves a pickling treatment to remove surface contamination. For applica-

*to page 78→*


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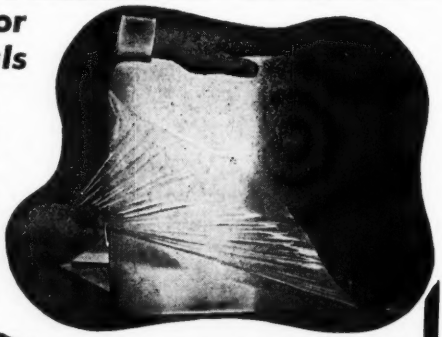

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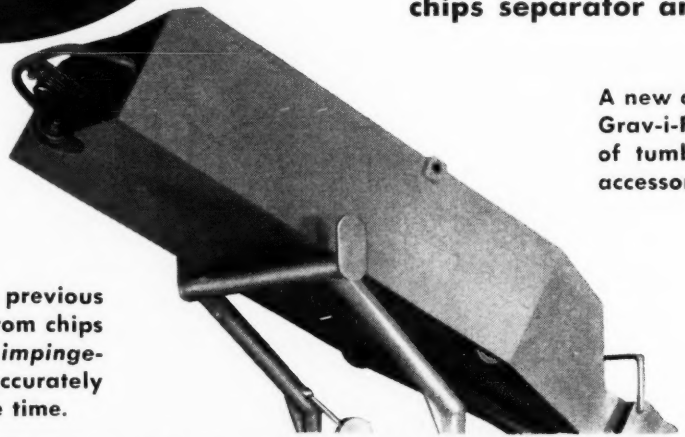

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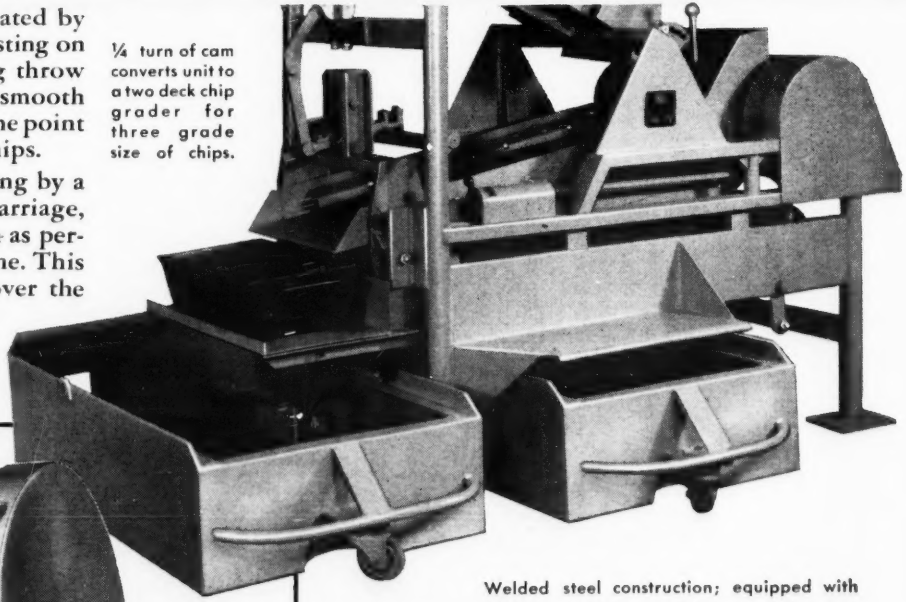

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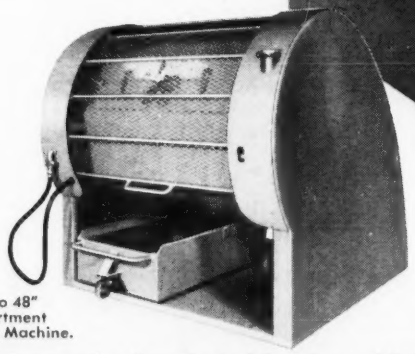

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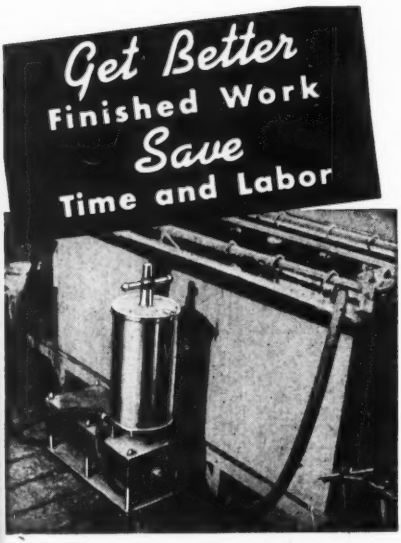


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tions requiring the maximum corrosion resistance it is essential to remove surface contamination by pickling. Foreign metals imbedded in magnesium during fabrication, such as mill scale, dissimilar metal particles, graphite base drawing lubricants and so forth, while not a general detriment when confined to small local areas in normal inland service environments, have been found to be a more serious source of initial breakdown in protection afforded by chemical treatment and subsequent paint coatings in more highly corrosive environments. While small local inclusions of this type may not be of concern on heavy sectioned parts, such as castings and extrusions, thin sheet may be prematurely affected in marine and high humidity environments.

One pickling operation that has been recommended[1] consists of immersion for about 30 seconds in a solution of 20-30 per cent acetic acid plus 5-10 per cent sodium nitrate. In order for this pickling operation to be of maximum benefit, it is desirable to use it immediately prior to application of protective chemical treatments, as surface contamination frequently occurs in fabrication processes, particularly in forming operations involving the use of steel dies.

Other methods of pickling are recommended for the following conditions of surface contamination. Graphite base lubricants are removed by treatment in hot 18 per cent chromic acid solution or in a cold 18 per cent chromic acid and 3 per cent sodium nitrate solution. Imbedded steel grit, sand, and so forth, from blasting is best removed from castings by pickling in cold 3 per cent sulfuric acid, or a mixture of 8 per cent nitric acid and 2 per

[1] Based on surface treatment methods described by H. K. DeLong, Dow Chemical Company, for Aircraft Industries Association, Aircraft Research and Testing Committee (Eastern Region), Technical Session on Magnesium (Dec. 1950).

# ENTHONE METAL STRIPPERS

## No Attack on Base Metal...Fast Action

**UPPER PHOTO**
Highly polished sandwich grill cover. Right half stripped with Metal Stripper "A". Note smooth bright surface ready for replating. Small parts may be stripped by basket or bulk processes.

**LOWER PHOTO**
Silver soldered gun parts. Top shows work with excess solder formerly removed mechanically. Bottom shows part cleaned with Metal Stripper "A". Result: a cleaner part free of scratches at lower cost. Photo courtesy High Standard Mfg. Co., Hamden, Conn.

**METAL STRIPPER "A"** is an alkaline material used at room temperature to 180° F. for rapid stripping of nickel, copper, zinc, cadmium and silver. No attack on base steel.

**METAL STRIPPER N-165 S** is a neutral material that is added to acids for rapid dissolving of nickel, lead, tin, zinc and cadmium from copper base alloys.

Work is immersed in an acid solution containing 1 lb. per gallon of Metal Stripper N-165 S from 150-180° F. Acids used are sulphuric, hydrochloric, sulfamic and fluoboric acids. Rate of stripping is from 0.001" to 0.008" per hour.

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cent sulfuric acid to a depth of 0.002 inch. A 15-20 per cent hydrofluoric acid pickle is satisfactory for castings that have been previously machined to close tolerances. However, the sulfuric or nitric-sulfuric acid pickles are slightly more effective but must be used on rough castings before machining. When castings have been previously pickled to a depth of 0.002 inch, the use of a 5 per cent sodium acid fluoride solution is a satisfactory alternative for the 15-20 per cent hydrofluoric acid treatment, as the initial step in meeting the requirements of Military Specification AN-M-12a, Type III, dichromate treatment.

* * *

## Electrodeposition of Aluminum

NUMEROUS efforts have been made to develop a successful process for plating aluminum on various basis metals. The search for a process has been made more important by the need for conserving many of the metals that are being used for alloying and coating steel products. In some uses, aluminum coated steel might replace the highly alloyed corrosion resistant and heat resistant steels. This would permit the use of low-alloy steel with a carbon content sufficient to meet the strength requirements, while the aluminum coating would provide the necessary protection against corrosion and scaling and thus conserve alloying metals. Aluminum coated steel has shown a high resistance to rusting in industrial atmosphere and sea coast exposures and has been reported to be superior to steel with galvanized coatings of similar thicknesses in industrial and humid atmospheres.

At the 100th Electrochemical Society Meeting, Dwight E. Couch and Abner Brenner reported on work which has been conducted at the National Bureau of Standards to develop a bath for plating aluminum on steel and other metals. As a result of this work, a new bath for electrodeposition of aluminum was developed. The aluminum deposits are quite ductile and deposition rates of 0.001 to 0.002 inch per hour are possible. Deposits of 0.02 to 0.035-inch thick have been produced with Vickers hardnesses ranging from 37 to 97.

In discussing work conducted at the Bureau of Standards, to evaluate processes which have been described in the literature for electroplating of aluminum, Couch and Brenner pointed out that aluminum has never been plated from an aqueous solution, in spite of claims to the contrary. Because its standard electrode potential in aqueous solution is so much less noble than that of hydrogen, it probably cannot be deposited from an aqueous solution. In the first phase of the investigation, fused aluminum plating baths were studied with a view toward possible improvement. A fused aluminum bro-

*to page 84→*

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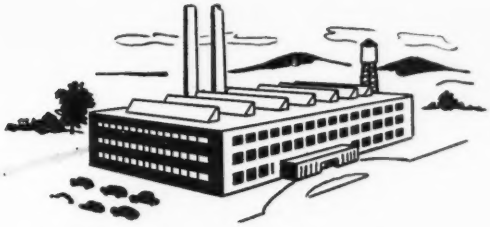

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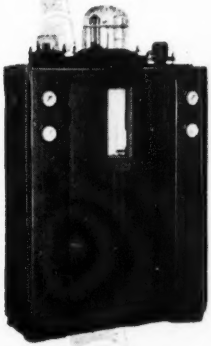

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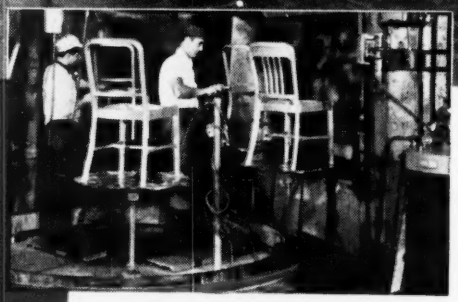

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mide-potassium bromide bath operated at 248-302 deg. F. was found to be the most promising plating system of

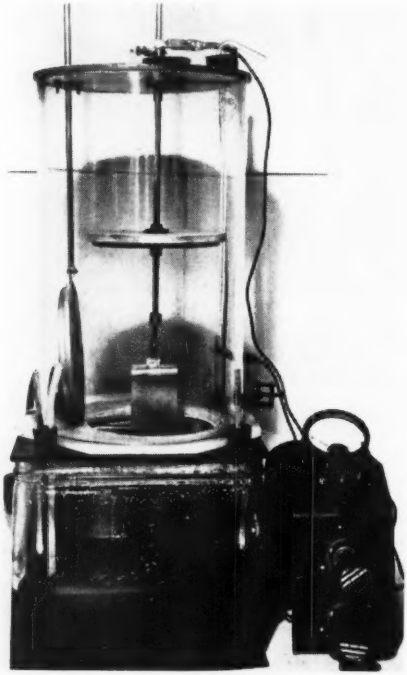

Fig. 1—A 15 liter aluminum plating bath used in studies at the National Bureau of Standards. The bath is constructed so the cathode is put through a dry box above the bath.

this type. However, this bath was corrosive, the throwing power was poor, and thick deposits were rough. Organic-type baths that have been described in the literature were also evaluated in the Bureau's experiments.

### Composition and Operation Conditions of New Aluminum Plating Bath

The new bath developed in the Bureau's work consists of an etheral solution of anhydrous aluminum chloride and a metallic hydride. Optimum concentration of the aluminum chloride was reported to be in the range 265 to 400 gm./l. The hydride was added as lithium hydride in concentrations of 4 to 8 gm./l. or as lithium-aluminum hydride. The bath was operated at room temperature and at current densities up to about 50 amp./sq. ft. Anode and cathode efficiencies were about 100 per cent.

Figure 1 shows an aluminum plating bath with a capacity of 15 l. which was used by Couch and Brenner in experimental work. The bath is so constructed that the cathode can be put in through a dry box above the bath. With this apparatus a minimum amount of moisture entered the bath. The plating solution was reported to be stable over long periods of time if moisture was excluded. Baths which were kept in covered containers to minimize the absorption of moisture from the air required occasional additions of lithium hydride to replace that decomposed by moisture. Baths which had absorbed too much moisture required the addition of aluminum chloride as well as lithium hydride for rejuvenation. It was reported that a one liter aluminum plating bath was kept in good working order for three months in this manner.

The smoothest aluminum deposits were obtained using periodic reverse current which involves making the article to be plated alternatively anodic and cathodic according to a predetermined cycle. Higher current for a shorter period of time is passed during the anodic cycle, but the ampere minutes are less than in the cathodic cycle. Since the overall current efficiency of the process is lowered by this procedure, it is necessary to use higher current densities to keep the same plating rate. Periodic reverse current prevented the deposit from becoming coarsely crystalline and reduced treeing to a large extent. Smooth sound deposits 0.75 mm. thick were produced, but they were described as

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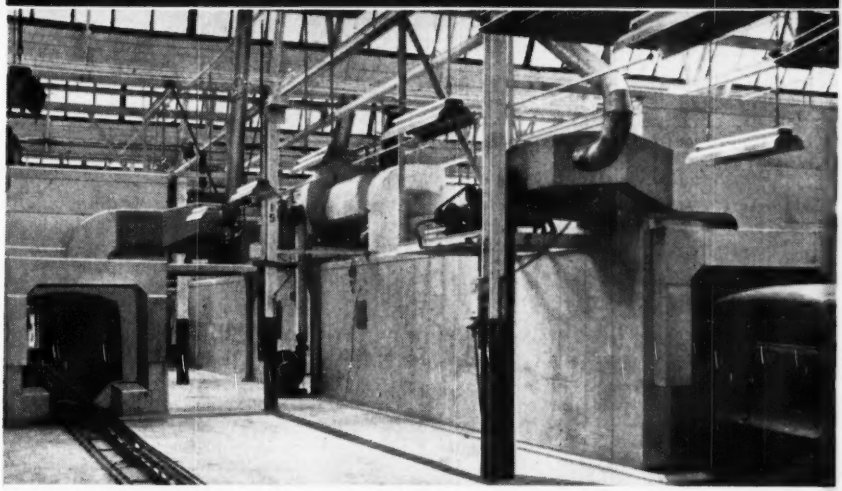

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**Table III**

ELECTRODEPOSITS OF ALUMINUM MADE WITH PERIODIC REVERSE CURRENT

| Time of Complete Cycle | Time of Plate | Time of Reverse | Current Density Amp/dm² Plate | Current Density Amp/dm² Reverse | Effective Plating Current Density Amp/dm² | Type of Deposit |
|---|---|---|---|---|---|---|
| secs. | secs. | secs. | | | | |
| 23 | 20 | 3 | 6 | 18 | 3 | Rough nodular |
| 11 | 10 | 1 | 8 | 24 | 5 | Rough nodular |
| 5.2 | 5 | 0.2 | 3 | 10 | 2.5 | Coarsely crystalline |
| 23 | 20 | 3 | 3 | 10 | 1.3 | Smooth matt |
| 23 | 20 | 3 | 5 | 15 | 2.4 | Rough nodular |
| 21 | 20 | 1 | 3 | 10 | 2.4 | Coarsely crystalline |
| 46 | 40 | 6 | 3 | 12 | 1.3 | Very smooth |
| 84 | 80 | 4 | 3 | 12 | 2.4 | Very smooth |
| 168 | 160 | 8 | 3 | 12 | 2.4 | Very smooth |

Note: All deposits were approximately 0.25 mm. thick.

Based on data presented by Dwight E. Couch and Abner Brenner at the 100th Meeting of the Electrochemical Society.

harder and less ductile than deposits made with direct current. Table III shows some of cycle times used and their effects.

### Properties of Aluminum Deposits

In discussing the properties of aluminum deposited from the hydride bath, Couch and Brenner pointed out that the appearance of the plate depended on the conditions of deposition and the amount of hydride in the bath. With the optimum amount of hydride (4 to 8 gm./l. lithium hydride) the aluminum deposit was matte and very white. Deposits over 0.3 mm. thick were visibly crystalline. With concentrations of hydride below 4 gm./l., the deposits were gray or slightly off color; with still less hydride, the deposits were dark, hard, and stressed, and often cracked or peeled from the cathode. However, these deposits were less crystalline and often smoother than those obtained under the optimum conditions of deposition. The smoothing effect of periodic reverse current on the deposit has already been pointed out.

Photomicrographs of the aluminum electroplates made in the Bureau of Standard's laboratories are shown in Figure 2. All of the deposits have a definite columnar structure. Those made at low current densities have rather large crystals as shown in Fig. 2C. As the current density was increased the crystals became smaller. Figure 2A shows a deposit made with periodic reverse current. It has the same columnar structure, but is much finer grained than the deposits without periodic reverse current. Figure 2B shows the effect on the deposit of adding BB' dichloroethyl ether to the bath. This deposit has a very fine grain structure and a smooth surface.

### Corrosion Resistance of Aluminum Electroplated Coatings

Data on the corrosion resistance of aluminum coatings plated from an aluminum chloride-ethyl pyridinium bromide eutectic mixture have been given recently by F. H. Hurley, Reed College, and T. P. Wier, Jr., Shell Oil Company, in the "Journal of the Electrochemical Society." In these studies,

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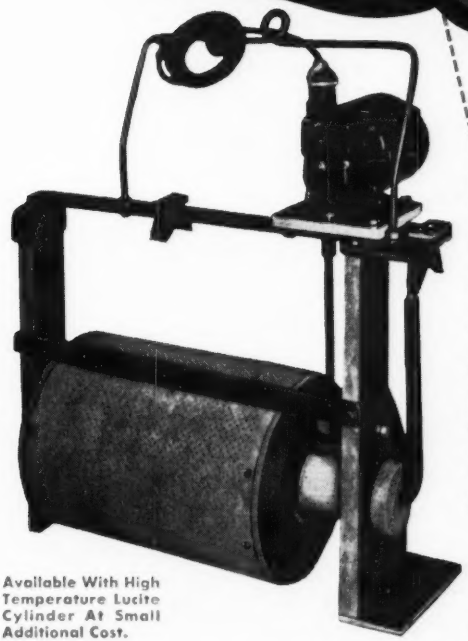

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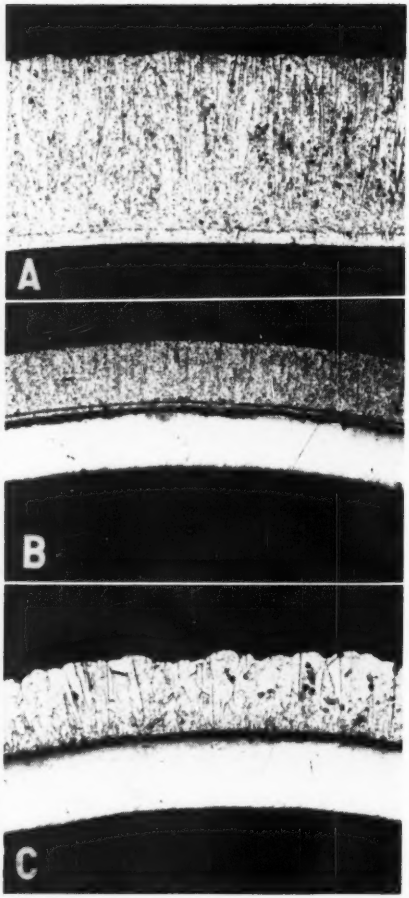


Fig. 2—Photomicrographs of aluminum plated from the hydride type bath at the National Bureau of Standards.
(Based on data presented at the 100th Electrochemical Society Meeting by Dwight E. Couch and Abner Brenner, National Bureau of Standards)

a number of aluminum plates made on iron, steel, and brass were exposed to the atmosphere for a number of weeks during which there were occasional rains. In one case, the exposure was 18 months. After atmospheric corrosion tests, the plates on iron showed a few pinholes which were not generally shown by plates made on steel or brass. The pinholes were attributed to the method of surface preparation since only cursory smoothing was attempted. There was no powdering of deposits due to prolonged exposure.

The value of the plated aluminum coatings as corrosion protection was demonstrated by inspection of the unplated portions of the cathodes which had been exposed to the same weather conditions. In every case there was a great deal of heavy rust on both iron and steel, whereas the aluminum plated portion retained a shiny appearance and showed only occasional pinholes. Another point noted was that these pinholes did not spread and rusting under the aluminum did not take place.

* * *

## Improving The Fungicidal Properties of Organic Coatings

THE toxicities of fungi of approximately 100 different toxic agents dispersed in varnish and lacquer vehicles have been studied by John M. Leonard and A. L. Pitman, Naval Research Laboratory. The study was prompted by the fact that one important aspect of the moisture and fungus proofing of military electronic equipment is the application of organic coatings. The results of the exposure tests which were conducted under the high humidity conditions of the Panama jungle were recently described in "Industrial and Engineering Chemistry".

Of the two vehicles selected for use in the tests, one was a phenolic tung oil varnish described under Specifica-

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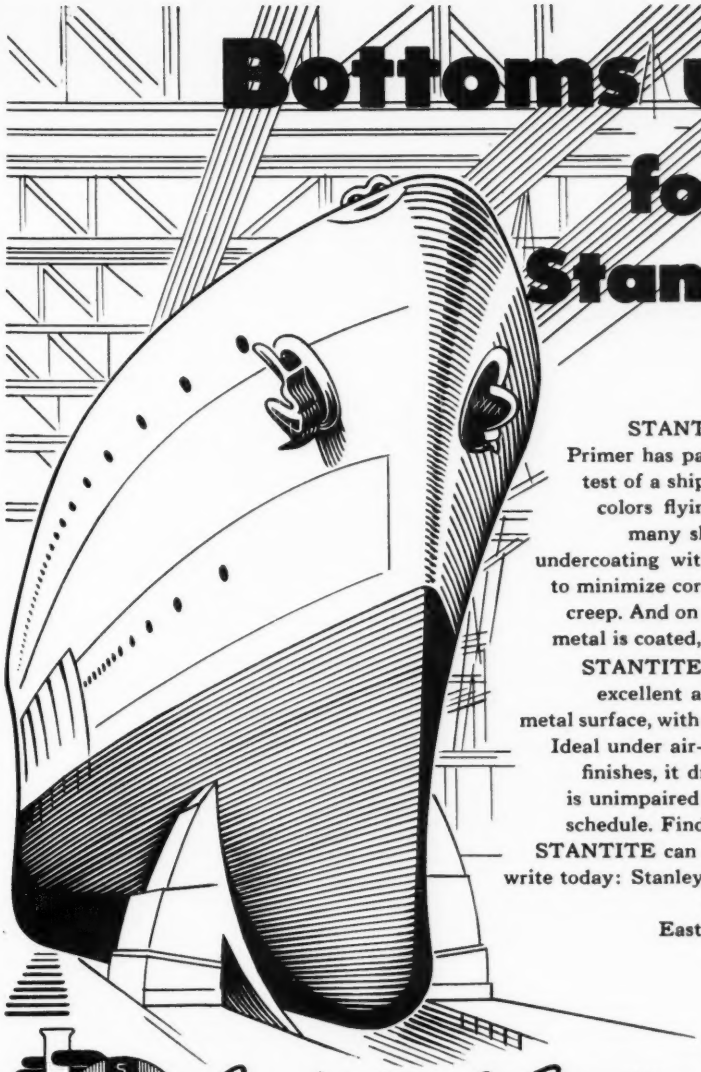

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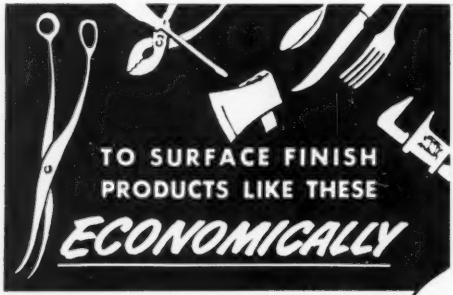
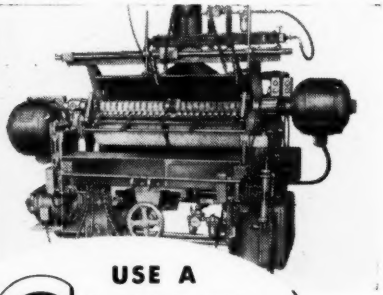
tion AN-TT-V-118 and the other an alkyd resin modified nitrocellulose lacquer, the composition of which is given in Specification AN-L-51. These vehicles were not selected as being necessarily optimum materials for the purpose intended but rather as being representative. Each is somewhat susceptible to fungus growth and since the purpose of the investigation was to explore toxic agents, it was thought advisable to use vehicles of moderate susceptibility so as better to differentiate superior toxic agents from mediocre ones.

The toxic agents were ground in ball mills into the two vehicles at 10 per cent concentration based on the nonvolatile content. Concentrations of 1 and 5 per cent were prepared by diluting portions of the 10 per cent grinds with appropriate amounts of vehicle. Coatings were applied to short lengths of wire, by dipping, and suspended horizontally in shallow wooden trays. The trays were exposed in a small hut in a Panama jungle with conditions which were very conducive to fungus growth. The humidity under the exposure test conditions was reported to be above 90 per cent most of the time and only rarely did it fall as low as 80 per cent. The temperature limits were approximately 74 to 86 deg. F. The wires were inspected at monthly intervals for fungus growth and ratings of performance were made on an arbitrary scale of 0 to 5.

Of the 100 different toxic agents incorporated in the varnish and lacquer vehicles at three concentration levels the following ten compounds were stated to be most nearly satisfactory, listed in an approximate descending order of effectiveness.

1. o-Hydroxyphenylmercuric chloride
2. Salicylanilide
3. Pyridylmercuric chloride
4. p-toluene sulfonylamide
5. Uranyl nitrate

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MANUFACTURING CO., INC.
*Specialized Machine Equipment For Glazing and Polishing Operations*
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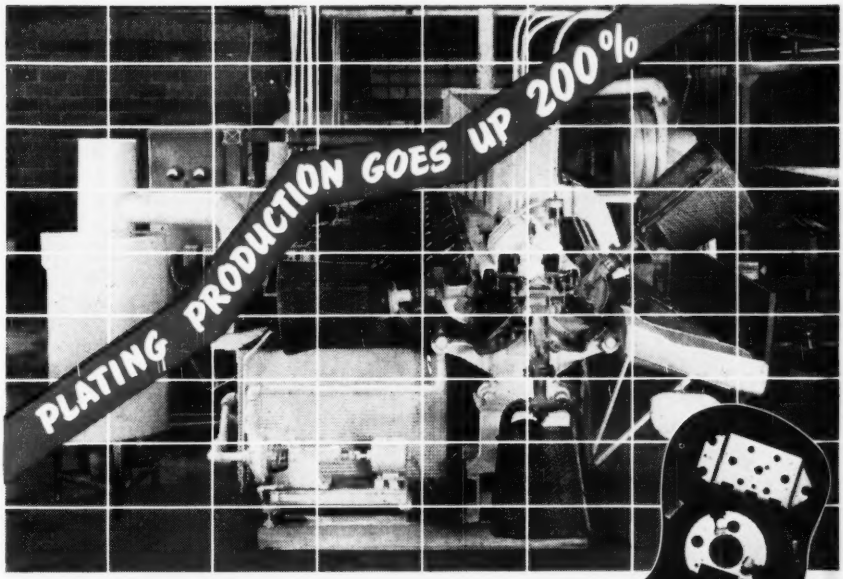


## WITH STEVENS AUTOMATIC BARREL PLATING MACHINE

### at Midwest Plating & Chemical Corporation

Here again is convincing testimony of a Stevens automatic machine's plating productivity.

Mr. Phillip A. Young, Treasurer of the Midwest Plating and Chemical Corp., Kokomo, Indiana, cites this superior production performance of a Stevens automatic barrel plater:

1. **Increase in production of 100 to 200% over other present facilities.**
2. **Less man-power needed.**
3. **Fully automatic processing, including drying.**
4. **Savings of plating materials. Salvage tank for plating materials included in machines.**
5. **Better current distribution on plated work.**

**"We feel this Stevens machine is the best piece of automatic barrel plating equipment for small parts on the market today," he concludes.**

You, too, can apply these profit-making benefits to your plating operations with Stevens equipment. Your nearby Stevens Representative can tell you how you can UP your plating production and reduce your unit-cost with Stevens Full Automatic Machines. Call him today or write direct. There's no obligation.

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We make nothing but thinners—For 27 years we have been saving money for big and little customers. They like us because we make the thinner they want at a money-saving price!

Let us show you how a Lacquer Thinner SPECIALIST can supply you with the right Thinner . . . and still save you money.

Just fill out form below and mail today. We'll work out a Thinner *especially for you*, and send a sample. Think we can do it for 85¢ or less a gallon too!

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We use Lacquer Thinner for:
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We use Lacquer Thinner on:
☐ Metal ☐ Wood ☐ Other_____
We want it to dry:
☐ Fast ☐ Slow ☐ Medium

Name_____
Address_____
City_____ Zone____ State_____

6. p-aminophenylmercuric acetate
7. Phenylmercuric-o-benzoic sulfimide
8. p-acetylaminophenylmercuric acetate
9. Hydroxymercurisalicylic acid anhydride
10. Phenylmercuric phthalate

In making the tests each of the primary variables, namely, vehicle, fungicide, concentration, and time of exposure were found to have a significant effect on the fungus growth. The tests showed that the varnish vehicle was more resistant to fungus than the lacquer, and similarly that varnishes containing the toxic additions were more resistant than the lacquers containing the toxic additions.

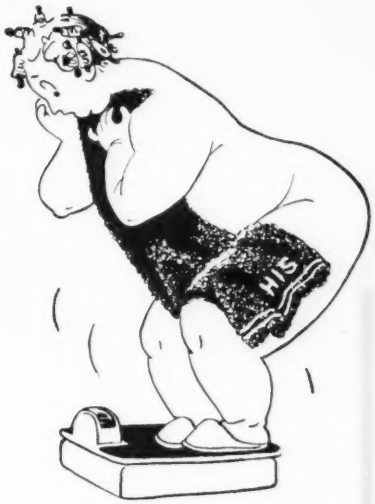
* * *

## Measurement of Flexibility of Lacquer Films

As part of a discussion on cellulose ester plasticizers presented to the Birmingham (England) Paint, Varnish and Lacquer Club, J. K. Aiken and I. Williamson, Geigy Co., Ltd., gave details of a specially designed torsion meter that may be used to study variation of flexibility of coatings with temperature. Details of the construction of the torsion apparatus are shown in Fig. 3 as given in the "Official Digest" (Feb. 1951). The test is performed on a detached film; the torsional modulus of rigidity was taken as an index of film flexibility, a low value for this being equivalent to a high flexibility. The material to be tested, in the form of a strip of approximate dimensions 1 x 12 x 0.025 cm., is rigidly connected at the upper end to the torsion wire, while the lower end is threaded through a guide-slit with a small clearance. A 10 gm. weight is attached to the lower end of the strip to prevent sagging or buckling; the lower part of the strip is thus free to move vertically.

# No Excess Weight

## ...when Monel's on the job




Hefty Hanna here has weight worries. Maybe fat and flabby pickling equipment is out-weighing production efficiency in your plant. Remember Monel®. Monel is lean and strong. Thinner sections of Monel mean light-weight fixtures and heavier pickling loads for you.

Right now, of course, weight-saving Monel is hard to come by – it's on extended delivery because of defense. So order well in advance – giving your fabricator NPA rating and complete end-use information.

And, today, write for "A Good Start To A Better Finish." Free, of course.

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**Monel** PICKLING EQUIPMENT

extra life
extra capacity
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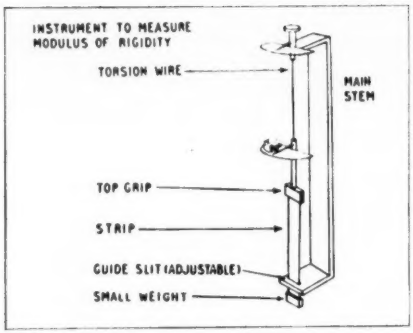


Fig. 3—Instrument for measuring the modulus of rigidity of coating materials.
*(Illustration courtesy "Official Digest," Paint & Varnish Production Clubs.)*

In operating the test apparatus, the head of the torsion wire is rotated until the upper end of the specimen has been twisted through 90 degrees, the force necessary to produce this distortion being given by the amount of twist in the wire (previously calibrated by an oscillation method). The modulus of rigidity is then given by the St. Venant formula (British Air Ministry specifications):

$$G = \frac{TL}{Cd^3ab}$$

where, **G** is modulus of rigidity, **T** is applied torque, **L** is length of specimen, **C** is breadth of specimen, **d** is thickness of specimen, **a** is a constant depending on shape (in this case equal to 0.33) and **b** is the angle of twist (90 degrees equals 1.57 radians).

To observe the variation of modulus of rigidity with temperature, the apparatus was enclosed in an air bath whose temperature could be varied between about minus 60 deg. C. and 100 deg. C. An example of the type of curve comparing rigidity modulus with temperature is shown in Fig. 4. The part of the curve based on observations is shown as a solid line. The dotted portion was obtained by extending the curve in the low temperature region towards a value of $10^4$ or $10^5$ Kg./sq. cm. which the experimenters stated was a reasonable figure for a glass-like solid, while the asympote at the "melting point" is a consequence of the logarithmic scale. This particular specimen was rubbery at ordinary temperatures; that is, in the region corresponding to the flattened step in the curve (between 40 and 80 deg. C.). The typical curve of a substance exhibiting rubbery elasticity thus possesses two horizontal portions, corresponding to a region of crystalline or glass-like rigidity with a modulus of $10^4$-$10^5$, and a region of rubbery elas-

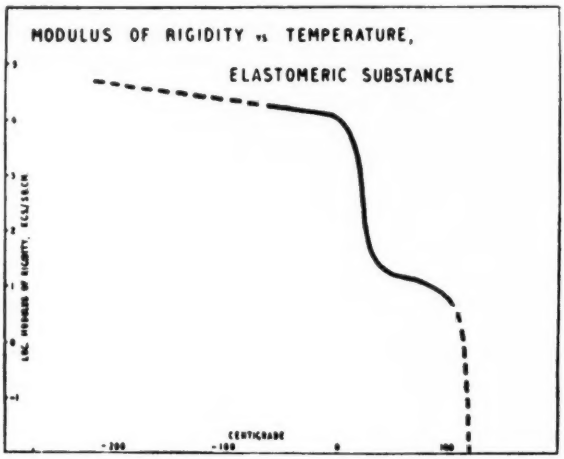


Fig. 4—Typical curve showing modulus of rigidity vs temperature for elastomeric substance.
*(Illustration courtesy "Official Digest," Paint & Varnish Production Clubs.)*

# NOW DIAL INFRARED HEAT WITH CHROMALOX *Electric Radiant Heaters*

**FOR**

- BAKING
- PREHEATING
- DRYING
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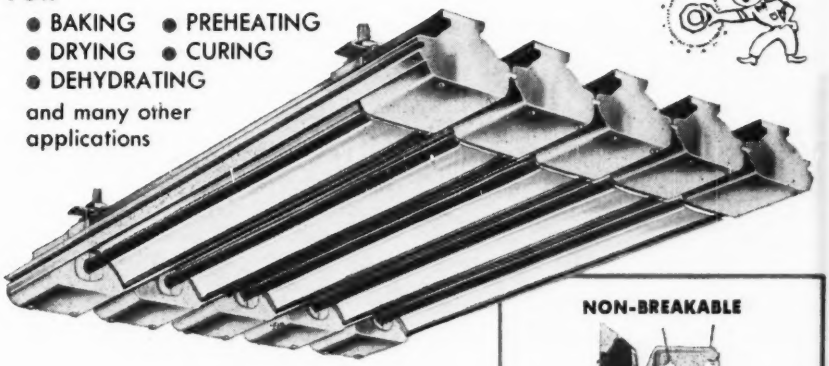
and many other applications



CHROMALOX Electric Radiant Heaters are a new and proved solution to process heat problems. They give you all of these production advantages:

1. **Infrared radiation in longer wave lengths which are absorbed with almost equal speed by all colors and surfaces.**
2. **Uniform blanket of heat without hot spots.**
3. **Infinitely variable heat, adjustable to the work from zero to 100% range, provided by dial controls.**
4. **Quick, low cost oven construction by interlocking units into desired assemblies.**

In addition—all-metal Chromalox Radiant Heaters are unbreakable and immune to shock, vibration, steam and splashed liquids; safe with volatiles.

Why not check this new production line tool? See how it can fit into your finishing operations.

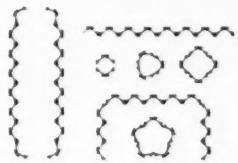
**Send for complete Application File**

You'll get details on many jobs Chromalox Radiant Heaters are doing in industrial plants; and you'll likely find application ideas which can point the way to added savings and increased production.

**NON-BREAKABLE**

There's nothing to break—nothing to shatter and contaminate work in process when Chromalox Radiant Heaters are on the job.

**VERSATILE APPLICATION**



Cross-section views of a few of the many oven designs possible with Chromalox Radiant Heaters.

IC-55

**Chromalox** electric heat for modern industry

EDWIN L. WIEGAND CO., 7552 Thomas Boulevard, Pittsburgh 8, Pa.

ticity of modulus 10-100, between which is a steep fall in modulus over quite a small temperature range.

A lacquer of the following composition was used in investigating the effects of plasticizers:

| | | |
|---|---|---|
| Cellulose nitrate (½ sec.) | 50 | parts by wt. |
| Butanol | 22 | parts by wt. |
| Butyl acetate | 26.5 | parts by wt. |
| Ethyl acetate | 36 | parts by wt. |
| Acetone | 16 | parts by wt. |
| Plasticizer | 0-40 | parts by wt. |

Varying amounts of thinner (toluene or benzene) were used depending on the intended application. The test compositions were applied by spreading with a doctor blade, set at 0.03 inch, to glass plates. After drying for 48 hours at room temperature, the films were stripped from the glass plates and conditioned by heating at 80 deg. C. for two hours in an air current. Steel panels were also coated for exposure to atmospheric weathering.

Aiken and Williamson found that unplasticized cellulose nitrate films gave a modulus temperature curve which was very close to a straight line. Addition of plasticizer reduced the rigidity, but the manner in which it did so varied according to the plasticizer. Polymeric plasticizers simply depressed the curve bodily over the whole region of observation, while monomeric plasticizers produced a much greater softening, and also altered the form of the curve by introducing a flattened portion. With monomeric plasticizers, there thus appeared a region of reduced temperature-sensitivity corresponding to the rubbery state, with a region of increased temperature-sensitivity immediately below it. However, it was pointed out that the question of which plasticizer is best for coatings even from the restricted point of view of the flexibility, must depend on whether strength or flexibility is regarded as the more important.

---

The total consumption of nickel for coinage purposes in 1949 throughout the world exceeded six million pounds. Because of increased defense demands for nickel, it is possible that use of this metal for coinage will be suspended.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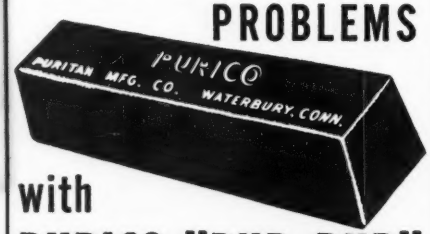


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PURICO "PUR-BUR"

PUR-BUR, new self-lubricating compound swiftly removes burrs, gouges, minute cracks —yet retains accurate finishes. Lasts longer, is more economical than ordinary polishing wheel. Available in cake and tube form.

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THE PURITAN MFG. CO.

WATERBURY, CONN.



For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.

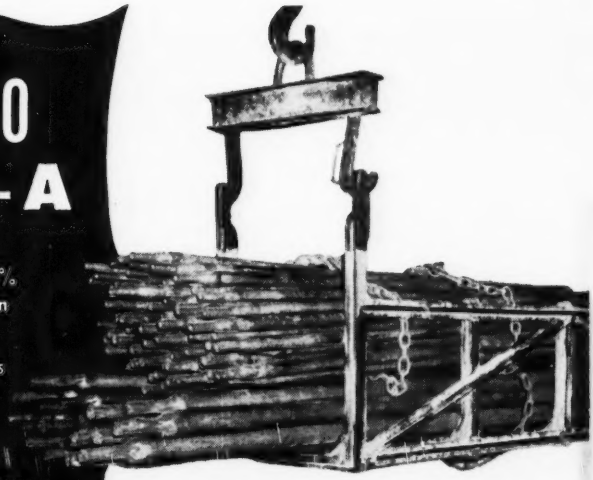
# NOPCO 1067-A

★ saves over 30% sulfuric acid solution in pickling of iron, steel and nonferrous metal products

★ aids processing

★ speeds production

★ assures improved output



Add Nopco 1067-A to the pickling bath, and you reduce loss of sulfuric acid solution through carryover to the rinsing tank by 30% to 40%.

Here's a definite economy, of outstanding benefit today when current restrictions limit the use of sulfuric acid.

But Nopco 1067-A not only effects high drainage, it also affords such important advantages as these:

★ ***faster, deeper, and more uniform penetration of oxide scale*—resulting in elimination of pitting, lower metal losses, and smooth, clean surfaces after pickling**

★ ***reduced operating time and lower costs*—since better drain-off means fewer rinsings for complete acid removal**

★ ***reduced acid contamination in operations following pickling*—with the result that tool and die life is increased**

★ ***easier acid disposal*—since acid is localized in first tanks**

In a word, addition of this unique surface tension depressant to your sulfuric acid pickling solutions not only means *money in your pocket,* but more satisfactory products coming off your production line.

**LET US TELL YOU ALL ABOUT NOPCO 1067-A. MAIL THE ATTACHED COUPON TODAY.**

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# PRACTICAL APPLICATIONS of Modern Products

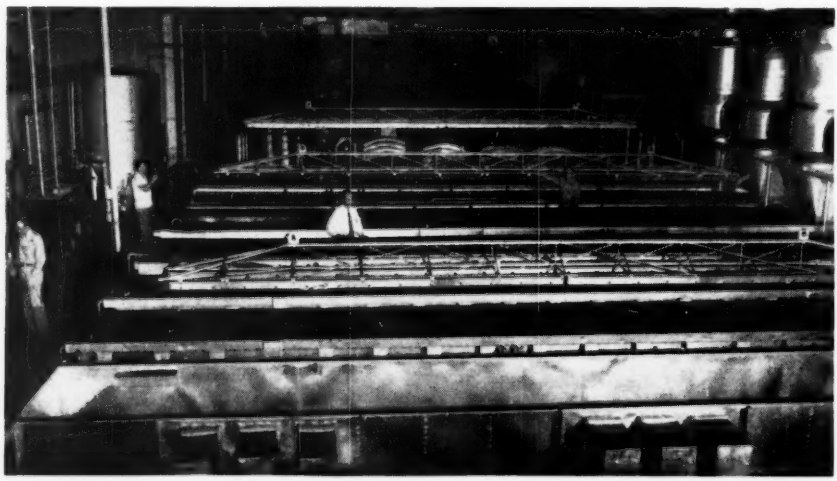
## Corrosion Protective Films Applied to Military Aircraft Assemblies

WHAT is believed to be the largest anodizing, Alodining, and chromodizing installation in the Southwest has just been placed in operation at the Temco Aircraft Corporation, Dallas, Tex. Used for processing mostly clad and extrusion alloys 24S and 75S, some coating is also done on alloys 17S, 61S, 14S, 25, and 35. Temco uses Alodine* to meet Specification MIL-C-5541 and conventional chromic acid anodizing to meet Specification AN-QQ-A-696a.

The installation consists of six 5,500-gallon processing tanks, a vapor degreaser, a steam dryer, an overhead bridge, and a centralized control panel (see Fig. 1). All tanks are 6 feet deep with a 5½-foot solution depth. Internal dimensions are 38 feet in length and 3½ feet in width.

The vapor degreaser is used for the removal of heavier deposits of grease and oil, and is followed by alkaline cleaning for removing other contamination. The cleaning is done in a solution of Ridoline 3192* at 180 deg. F.

Fig. 1—View of the 5,500-gallon processing tanks for treating airplane parts at Temco.



for 3 to 7 minutes. The rinse tank that follows in line does double duty, being used for the alkaline cleaner rinse and sealing after anodizing. It contains waste chromic acid from the anodizing tank and is maintained at 180 deg. F., and a pH of 5 to 6.

The next tank in line is the anodizing tank which is operated at a temperature between 91 and 99 deg. F. and is serviced by two 40 V. generators, one of 2,000-ampere and one of 1,000-ampere capacity.

Following the anodizing tank is the Alodine tank which is operated at 110 to 130 deg. F. Parts are immersed in this tank from 2 to 5 minutes and are then rinsed in clear water at room temperature. The next tank contains the Deoxylite* solution, and the last tank in line is the hot air dryer.

Due to a bad weather condition which would seriously hamper the efficiency and quality of the processes, a system was designed to furnish the critical solutions with improved water. This is done very economically by accumulating the condensate from the steam heating coils in the alkaline cleaner tank, hot rinse tank, dryer, and the other heated tanks. The condensate is accumulated in a small sump. When this sump is full, a float switch is actuated and the water is pumped through a filter into a 3,500-gallon storage tank. Overflow from the storage tank, which is estimated at about 2,000 gallons in a 24-hour period, is run into the rinse tank which is used for sealing the coating. The tanks serviced with condensate are the anodizing tank, the Alodine tank, the Deoxylite tank, and the anodize seal rinse tank.

One of the most unusual features of the Temco setup is the control panel which was designed and fabricated by the Temco Maintenance Department, and which provides a single, centralized control for all three processes—anodizing, Alodining, and chromodizing (see Fig. 2). All controls for the pumps, cooling tower, and all electrical instruments are located on this panel. Also, automatic temperature controllers and recorders, the latter only for the anodize and Alodine tanks, are on this control panel.

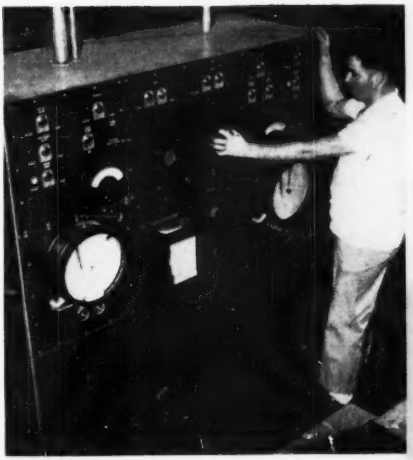


Fig. 2 — The centrally located control panel from which all three processes are controlled.

Handling equipment consists of four large racks and an overhead bridge crane with an assortment of racking equipment capable of handling a wide variety of parts. The chemical dip process is used as much as possible because of simplified racking and a much shorter time cycle in processing. This leaves the lower capacity anodizing process free to handle the parts which are not adaptable to Alodine due to their shape or particular use.

The tanks when utilized to the full extent, are capable of high volume output. Shortly after being placed in operation, 16,000 parts of all sizes from 34-foot spars to small washers and clips were handled through these tanks in one shift.

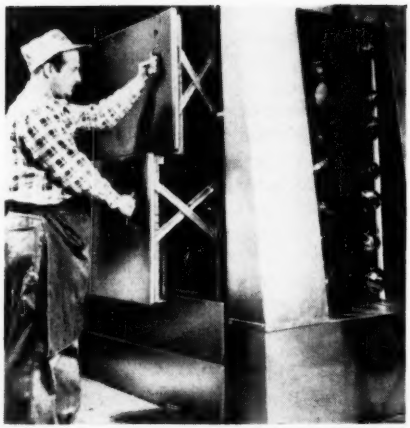
* Trademark, American Chemical Paint Co.

# New Type Ovens Increase Production of Automobile Accessories and Trim Parts

THOUSANDS of automobile accessories and trim parts are washed, dried, and given three coats of baked-on finish in four prefabricated electric ovens at the Detroit plants of the Metal Mouldings Corporation.

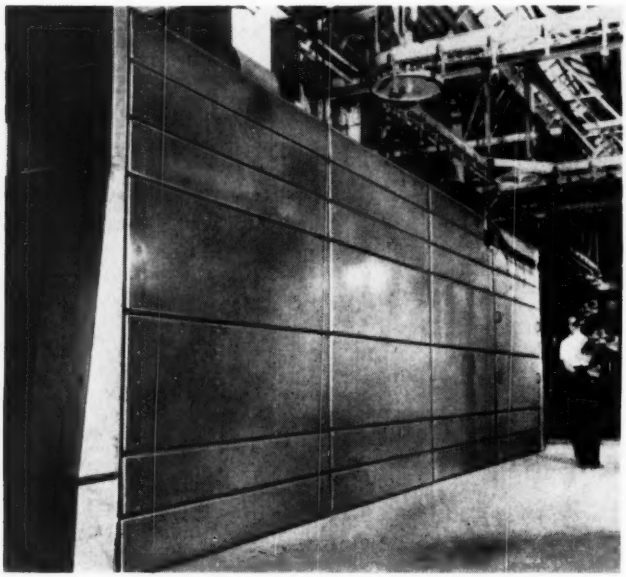
The ovens, designed and built by Jensen Specialties, Inc., Detroit, occupy 624 square feet of floor space, about 25 per cent of the requirement for convection type ovens. With a 700-foot monorail conveyor and Ransburg electrostatic spray painting equipment, the system is entirely automatic except for loading and unloading. Space required is only 63 by 72 feet, with 13 feet of headroom.

Radiant heating for the Jensen ovens is produced by General Electric Calrod tubular, plug-in, lock-in type heaters, which have a life in excess of 8000 hours. Mounted in wall panels through a rapid temperature elevation zone, these panels open outwardly to permit servicing of all electrical parts. Finned Calrod heaters provide instrument controlled convection for the temperature holding zones.



Heater panels open easily for oven inspection and maintenance.

A master electrical control panel provides sequence starting. Because it will automatically shut down the system in the event of a faulty condition, the stripping and refinishing of production parts are avoided.

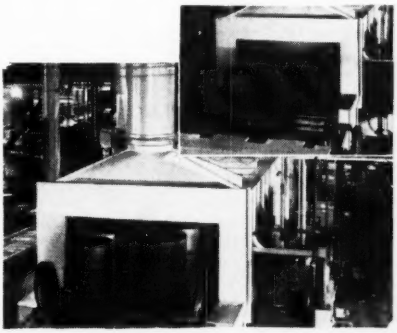


New panel heater type oven in use at the Metal Mouldings Corporation.

The heaters and their lock-in type receptacles permit all electric connections to be made outside the heating zone. Cold sections in the heaters prevent heat loss through the insulated wall and at the supporting points. Special aluminum reflectors control the radiant energy delivered by the heaters and otherwise reduce thermal losses through the walls.

## Nine-Stage Unit Processes Drums

MORRISON Industries, Inc., 17700 Broadway, Bedford, Ohio, has recently completed installation of a



Spray-type processing machine for 55-gallon drums

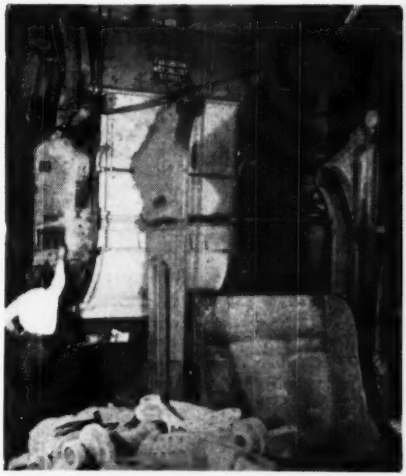
spray-type processing machine for 55-gallon drums, which operates nine stages comprising alkali wash, sulfuric acid pickling, and phosphate coating to prepare the drums for painting. The drums can be processed both inside and outside. Interior processing requires that the drums go through the machine before the ends are welded.

According to Morrison, this continuous process machine offers the following advantages: operations are fast and require little manpower; its compactness results in smooth, well controlled operations, and a uniform product; maximum safety is assured because all operations are enclosed, eliminating hazards from fumes, odors, splashes, and so on.

## Rocking Barrel Blast Unit Cuts Casting Cleaning Costs

THE installation of a 28-cubic foot capacity Rotoblast Barrel in a large Midwestern foundry now permits one man to do the work of three. This unit blast cleans 500 tons of green work and 250 tons of annealed castings a month and saves the company $144 a week.

Manufactured by Pangborn Corp., Hagerstown, Md., the Rotoblast Barrel cleans 1,500 to 2,000 pounds of 40 to 600-pound castings at a time by automatically rolling them under a centrifugally hurled abrasive stream so that all surfaces are exposed to the cleaning jet.



Pangborn Rotoblast Barrel in operation

# NEWS of the Industry

## NEW PLANTS

J. R. Wagner, president of **WAGNER BROTHERS, INC.**, Detroit, Mich., has announced the completion of the new wing which will house additional anode production facilities. Built of structural steel and cinder block, the building will employ the latest lighting, heating, and ventilating equipment.

Completion of the structure was celebrated by a dinner and entertainment for approximately 1,500 guests.

The new construction is the fourth expansion in as many years, and it will more than triple existing production of Flat-Top and Iso-Cast Anodes, according to Henry Tiedeman, works manager.

---

**ELECTROPLATING, INC.**, 22126 Ryan Rd., Van Dyke, Mich., is one of the latest job plating plants in the Detroit area. The new plant, comprising 1,600 square feet of working area, is equipped for copper, nickel, and chromium plating on a decorative basis, gray nickel for ordnance work, and hard chromium plating.

Charles Tackels, formerly service engineer for The Udylite Corporation, is operating the plant.

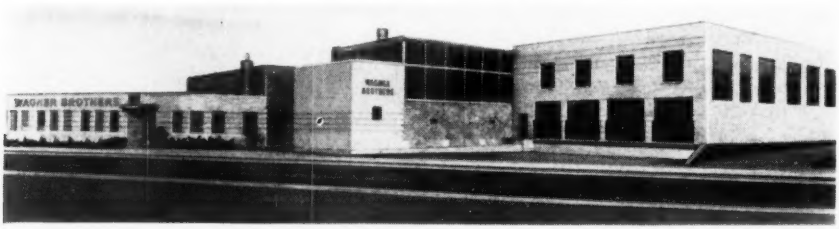
## COMPANIES

The formation of **HAMPEL-MODJESKA LABORATORIES** was announced by Clifford A. Hampel, formerly supervisor of extraction metallurgy at Armour Research Foundation, and R. Scott Modjeska, founder and director of Scientific Control Laboratories of Chicago, Illinois.

The new organization will conduct research and development studies, technological and economic evaluations, and consulting work for industry and government in the fields of industrial chemicals, electrochemical and electrometallurgical processes and products, and the recovery and utilization of strategic metals.

Until new quarters are available, the company will use the facilities of the Scientific Control Laboratories, 600 S. Blue Island Ave., Chicago.

Newly completed wing of Wagners Brothers, Inc.



Industrial Ovens, Inc. sales representatives for the United States, Canada, Europe, and South America are pictured during an inspection of IOI's new coating research and development laboratory in Cleveland.

Sales representatives for Europe, South America, Canada, and the United States were afforded a preview of **INDUSTRIAL OVENS'** new laboratory for research and development in the coating field during the company's annual sales convention in Cleveland, February 17-19.

Policies and methods which will be put into effect so that the various industries served by IOI will derive maximum benefit from the new laboratory facilities were outlined by C. A. Litzler, president, and J. K. Gillett, sales manager. The group also heard H. L. Bullock, consulting engineer of Bullock-Smith Associates, New York City, speak on the subject "Trends in the Coating Industry." Other topics covered during the three-day session included recent IOI developments.

---

It was announced that **BARBER-COLMAN COMPANY** of Rockford, Illinois, will purchase the principal assets of **WHEELCO INSTRUMENTS COMPANY** of Chicago. Wheelco products consist of indicating, recording, and controlling industrial instruments, and combustion safeguards.

Present plans are to continue current operations in Chicago until such time as manufacturing facilities can be gradually transferred to Rockford in a manner that will result in very little interruption in shipments. No changes are contemplated in Wheelco's national sales and service organization.

---

Gerald G. Kraft, Kraft Chemical Company, Chicago, has announced the formation of the **KAYNIDE DIVISION.** This new division will be devoted exclusively to the plating, heat treating, and allied metal finishing industries, and will take over the sales and warehousing of chemicals, anodes, processes, equipment, and plating supplies formerly sold by Kraft Chemical Company. Through its technically trained staff, the Kaynide Division will be in a position to install any size plating process, it is stated.

The Kaynide Division has established a department specially trained to keep its customers informed of changes in the Government price control setup and its effect on the plating industry.

---

All industries that are working with or producing metal products are now being offered free assistance in their metal finishing or coating problems as a special service of the **PORCELAIN ENAMEL INSTITUTE.**

A special committee, known within the Institute as the New Uses Committee, and headed by C. P. Lohman, an industry authority, has been established this year for the purpose of researching new applications for porcelain enamel and to provide the consulting, technical, or developmental assistance any metal product producer may need in testing porcelain enamel as his product finish. This service will be rendered without charge by the Institute, and will provide manufacturers of metal products with an opportunity to obtain counsel regarding the applicability of porcelain enamel to specific finishing problems, specialized information regarding design and metal fabrication to adapt a product to porcelain enameling, technical assistance concerning the type of porcelain enamel required for various types of services and technical data.

Manufacturers who would like to ob-

tain the services of this committee on any type of metal product finishing or coating problem may do so without obligation by addressing the New Uses Committee, Porcelain Enamel Intsitute, 1010 Vermont Avenue, N. W., Washington 5, D. C.

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After extensive research and development, along with pilot line production, the **WIRE COATING AND MANUFACTURING COMPANY** of 395 East 131st Street, Cleveland, Ohio, is planning facilities for extended production of zinc plated magnesium sheets for use by the photoengraving and printing industry. It is believed that the bimetal sheet, designated Nuloy, has bridged a gap between the zinc and copper plate and the straight magnesium or magnesium alloy plate in that it requires only the conventional treatment and use of materials now standardized in the photoengraving industry.

In the development of zinc deposition on magnesium, it was found that the zinc must be of a dense, uniform, mirror-type finish, and of an appreciable thickness. It has also been necessary to develop a thermoplastic type of back coating for the protection of one side of the Nuloy plate.

It is believed that the installation of facilities by the company for the electrodeposition of zinc on magnesium will be the first of any extensive facilities in this highly specialized field. It is thought that laboratory formulations and application methods now under development by the Wire Coating and Manufacturing Company will lead to important future development in the plating of other metals on magnesium for commercial use in many other industrial fields.

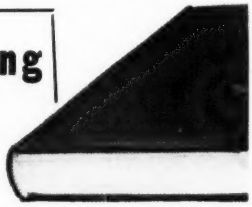
## NEW POSITIONS

Promotions of two employees in the sales division of Norton Company were announced recently by Ralph M. Johnson, vice president in charge of sales .

**C. JOHN SUNDBERG** was appointed assistant to the vice president in charge of sales for the Abrasive Division and **STEPHEN SMITH** was named supervisor of the Worcester sales office.

Mr. Sundberg has been manager of the Worcester sales office since 1934. He joined the company 40 years ago as as-


**Bringing you Modern developments in plating processes and methods**



HERE are the basic theories and principles of electroplating—the practical methods and processes that are of invaluable use to everyone concerned with electroplating and electrotyping. The most efficient methods of making electrodeposits on more than 40 different metals, alloys, and plastics are summarized completely in this thoroughly revised and enlarged book.

**Principles of**
**ELECTROPLATING & ELECTROFORMING**

By William Blum, Chemist, U. S. Bureau of Standards and George B. Hogaboom, Consultant

Revised 3rd Edition
455 pages, 6 x 9
24 tables, illus.
$6.50.

Completely revised to make it a more practical working guide, this book summarizes and digests the best of modern practice in the field. It covers qualitative, quantitative analyses of solutions; pickling, dipping; electropolishing; electroforming, electrotyping; producing phonograph record matrices, and manufacturing tubes, etc. Metals are dealt with in the same order as in the periodic system of elements.

*(Please send check with order)*

**PRODUCTS FINISHING, 431 Main Street, Cincinnati 2, Ohio**

sistant manager of the order department, becoming manager in 1919.

Mr. Smith formerly was associated with the manufacturing and wage control of the company in 1947, serving in that capacity for two years until his transfer to the sales department in 1949.

---

Charles J. Pecoy

Louis F. Body, president of Body Bros., Inc., Bedford, Ohio, industrial paint manufacturer, has announced the appointment of **CHARLES J. PECOY** as sales manager.

Mr. Pecoy has been connected with the paint industry for many years, and has spent the last 13 years in the sales department of the Patterson-Sargent Company. He has had a wide variety of experience with the production-finishing problems from small toys to giant road building machinery.

---

The board of directors of The Carborundum Company have elected **CLINTON F. ROBINSON** as president and director of the company to succeed **H. K. CLARK** who resigned as president, according to an announcement for the board by E. R. Broden, executive vice president.

Clinton F. Robinson

Under Mr. Clark's presidency, a strong, integrated organization was effected, and the company's plants were modernized and expanded. Mr. Clark will continue with the company as a member of the board of directors.

Mr. Robinson has a distinguished record in both the military and industrial fields. A graduate of West Point and Cornell University, he has had extensive administrative and engineering experience, both public and private, in the United States and overseas.

Also announced was the election of **PAUL B. BROWN, CLARENCE E. HAWKE,** and **WILLIAM H. WENDEL,** formerly managers of the Bonded Products and Grain Division, Refractories Division, and Coated Products Division respectively, as vice presidents in charge of their divisions.

---

C. D. Clawson, president of Ferro Corp., Cleveland, Ohio, has announced that **PAUL S. GRUBER** has been promoted to the post of assistant chief engineer of Ferro's Engineering Division.

Paul S. Gruber

Mr. Gruber has been with the Cleveland corporation since 1930, when he joined the Engineering Division as a draftsman. During World War II he served as a Ferro field engineer engaged in the design and construction of heat treating furnaces for plants throughout the country.

For the past two years he has been working with General Electric on the installation of porcelain enameling equipment in that company's new appliance manufacturing plant in Louisville, Kentucky.

---

**DR. JACK B. CALLAWAY** has been appointed manager of West Coast sales for the Pigments Department of the Du Pont Company, at Los Angeles, it was announced recently. He succeeds **ROBERT P. ENSLIN,** who died last year.

**M. JAMES McLAIN,** formerly a pigments salesman at Cleveland for the central area, succeeds Dr. Callaway as sales promotion manager for dry colors in the Wilmington headquarters of the company. **LELAND F. ANDREWS** succeeds Mr. McLain, with headquarters in Cincinnati.

Dr. Callaway has been engaged in re-

search and sales work for the company since 1936, when he became a research chemist on dry colors at the Newark, New Jersey plant. He advanced to group leader there in 1940 and division head in 1948. He was appointed sales promotion manager for dry colors in 1949 and from that post was named manager of West Coast sales.

---

The creation of a New Products Department and the appointment of **JOHN P. EMMETT** as its head have been announced by A. O. Thalacker, vice president and general manager of Detrex Corp., Detroit 32, Mich. The urgent need for the formation of such a department has resulted from the company's extensive research program and increased activity in new product development.

John P. Emmett

Mr. Emmett will handle the market research and sales development of all new products while they are in the pre-marketing phases. During the six years he has been with Detrex, he has gained broad experience in the sale and service of the company's industrial cleaning equipment and chemicals. He also served as assistant sales manager of the dry-cleaning division.

---

H. J. Hater, president of Aluminum Industries, Inc., Cincinnati, Ohio, has announced the appointment of **R. WAIN BOWMAN** as general manager of the company's Aluminum Paint & Varnish Division. Mr. Bowman has been associated with Aluminum Industries for the past ten years in the capacity of assistant director of purchases.

---

A. E. Horn, president of the A. C. Horn Company, Division of Sun Chemical Corporation, has announced the appointment of **W. V. KEEGAN** as vice president in charge of production of all A. C. Horn Company plants manufacturing paint, varnish, and enamel.

W. V. Keegan

Mr. Keegan, a graduate of Fordham and Rutgers University, is a chemist, patent attorney, and member of New York State Bar. He has been associated with Sun Chemical since 1941 and became a member of the Horn Division in 1948.

According to Mr. Horn, Mr. Keegan has streamlined their system of paint manufacture, enabling each Horn plant to increase its volume and at the same time maintain a rigid control of quality.

---

**UNITED BUFF PRODUCTS CORP.**, Passaic, N. J., has announced the following representation for its Patented Pressure-Cooled Airflow Buffs and Aircon Wheels:

Representatives in Wisconsin and Minnesota are R. L. Hundley and his staff, R. L. Hundley Co., 3100 W. Walnut St., Milwaukee 8, Wisconsin.

A sales office has been established at 319 Illinois Oil Bldg., Rock Island, Ill., to service a large portion of northern Illinois, Iowa, and Nebraska. T. Means will service the Iowa and Nebraska territory, while Willard H. Johnson will cover Illinois.

Distribution of its products in Louisiana and Mississippi will be provided by warehouse and sales facilities located at Industrial Machinery, Inc., 501 N. Cortez St., New Orleans, Louisiana.


**CHEMSTEEL** CONSTRUCTION COMPANY, INC.
301 Chemsteel Bldg., Walnut St., Pittsburgh 32, Pa.

Send data on Engineering & Construction facilities for
**ACID-ALKALI-PROOF CONSTRUCTION**
of processing & storage tanks & flooring in
☐ Steel Plant ☐ Chemical ☐ Textile ☐ Food

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*Harshaw*

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***CADMIUM FLUOBORATE***

***• Lead Fluoborate •***

***• Copper Fluoborate • Tin Fluoborate •***

***• Fluoboric Acid •***

in CLEVELAND • 1945 E. 97th St.

in CINCINNATI • 611 American Bldg.

in CHICAGO • 505 North LaSalle St.

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BRANCHES IN PRINCIPAL CITIES

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in NEW YORK • 420 Lexington Ave.

in PHILADELPHIA • Jackson and Swanson Sts.

in PITTSBURGH • 7th and Carson Sts.

*Select the nearest Harshaw Branch*

A Michigan branch office has been established at 10550 Grand River Ave., Detroit 4, Mich., and is headed by C. A. Hubley.

The company's products are also being made available to users in the Province of Ontario. Distribution and warehousing are through Thomas Buff & Brush Co., Ltd., 174 Catherine St., N., Hamilton, Ontario, Canada.

---

Martin E. Gilwood

**MARTIN E. GILWOOD** has been named director of research of The Permutit Co., New York, N. Y. He will be responsible for all operations of the company's research, analytical, and pilot plant laboratories at Birmingham, New Jersey, and for market research activities from his office in New York.

Mr. Gilwood, a graduate chemical engineer from Rensselaer Polytechnic Institute, is well qualified for his new duties, having risen in successive steps from research engineer to director of research.

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Appointment has been made of **H. WILLIAM RUSSELL**, a wartime Navy pilot, as control chemist in the research laboratory of the United Lacquer Manufacturing Corp., Linden, N. J. He has been engaged in the research and development of lacquers, enamels, and other finishes since 1945.

A chemical engineering graduate of the Newark College of Engineering, United's new control chemist has also studied at Dartmouth and at the Brooklyn Polytechnic Institute.

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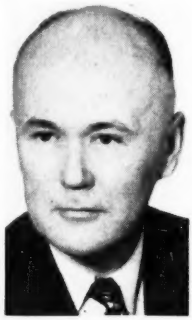

G. G. Willson

Appointment of **G. G. WILLSON** as manager of the Technical Service section of the "3M" coated abrasives laboratory was announced by Minnesota Mining and Manufacturing Co., St. Paul, Minn. He will be responsible for all technical service functions of the laboratory, as well as a technical training program recently instituted for selected 3M sales personnel.

Mr. Willson joined the mineral research department of 3M's coated abrasives division in 1935, moved to the waterproof abrasives laboratory in 1942, and has served as supervisor, technical service section, since 1948.

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The appointment of **R. T. HOPKINS** as a distributor of its MD Aluminum Pastes and Powders and MD Gold Bronze Powders in the States of Georgia and Florida and the A. Hoffman Co. in central and southern Indiana has been announced by Metals Disintegrating Co., Elizabeth, N. J., manufacturer of metal pigments, metal abrasives, and metal powders.


*Yes:* WE'D LIKE TO GET A COPY OF THE BIG NEW **M & E** SPRAY FINISHING EQUIPMENT GUIDEBOOK

**SPRAY BOOTHS - Systems**

M&E MANUFACTURING COMPANY
PAINT SPRAY FINISHING SYSTEMS
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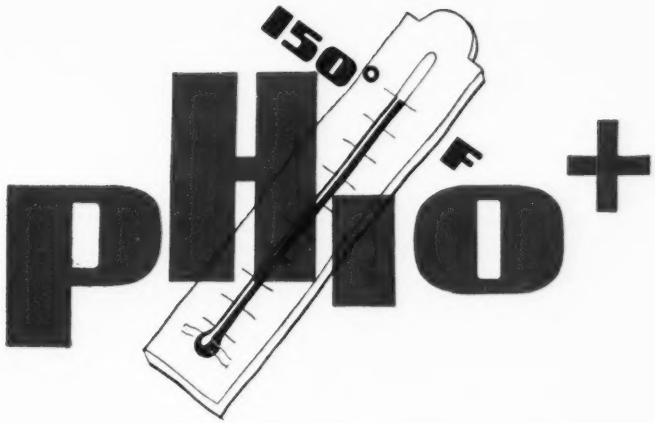


# Plating with hot alkaline solutions *demands* DARCO® G-60!

Solutions with a pH of 10 or over operated above 150° F. call for the use of an activated carbon extremely low in silica. Otherwise, you can expect trouble with silicates causing anode polarization—and possible operating trouble.

The one carbon that meets all the requirements of the plater using hot alkaline solutions is Darco G-60. It is sulfide free as well as being extremely low in silica. It is outstanding for adsorption of impurities from strongly alkaline solutions. Only half as much is needed as with ordinary carbons.

And Darco G-60 couples high adsorptive qualities with prompt wetability.

*Send for reprint of "Filter Out Your Plating Rejects."*

DARCO

DARCO DEPARTMENT
ATLAS POWDER COMPANY
Darco General Sales Offices
60 East 42nd Street, New York 17, N. Y.

Appointment of **JOSEPH A. SNOOK** as vice president in charge of sales of Atlas Mineral Products Company, Mertztown, Pennsylvania, and Houston, Texas, was anounced by George L. Wirtz, president, at the recent National Sales Conference.

Mr. Snook, associated with the company since 1942, served as secretary and purchasing agent prior to this appointment. A graduate of Pennsylvania State College, he was with the Duquesne Light Company before joining Atlas.

---

Appointment of **WILLIAM C. VAN CLIEF, JR.**, as manager of Pittsburgh Plate Glass Company's new power driven brush factory at Baltimore has been announced by E. D. Peck, general manager of the firm's brush manufacturing division.

Mr. Van Clief has served as an industrial consultant since 1946 and prior to that was associated with the Wright Aeronautical Corporation. He is a graduate of the University of Florida with a B.S. degree in civil engineering.

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## SOCIETIES

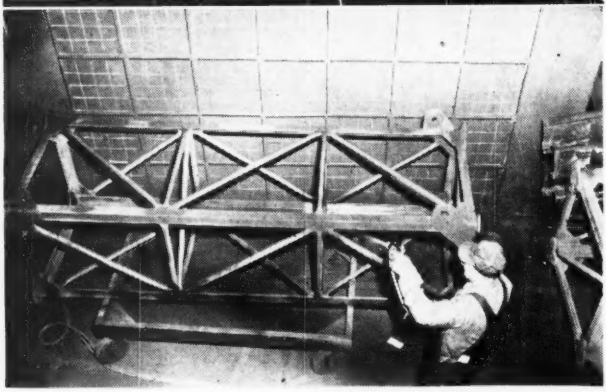
On Friday, April 4, the **CHICAGO BRANCH, A.E.S.,** installed the following officers: president, Raymond F. Ledford; first vice president, Elmer Olson; second vice president, E. Staneck secretary-treasurer, Paul Glab; and librarian, Joseph M. Andrus. Board of managers are Dr. J. H. Monaweck, Harold Faint, and Rudy Hazucha.

---

The **FEDERATION OF PAINT AND VARNISH PRODUCTION CLUBS** has moved to its new office at 121 South Broad Street, Philadelphia 7, Pa.

The location is in the heart of the Philadelphia business district, convenient to all transportation and hotel facilities, and members and friends of the Federation are urged to visit headquarquarters and use it as their Philadelphia office when they are in town.


**WHO SAID PAINT OVERSPRAY REMOVAL WAS A PROBLEM?**



**This R P Paint Arrestor Installation Is Economical, Effective . . . Requires a Minimum of Floor Space.**

A wall of R P Paint Arrestors and a blower solved the manufacturer's paint overspray removal problem in painting sections of structural steel in the installation above. Versatile R P Paint Arrestors can be the economical solution for your plant, too.

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Helpful, informative suggestions to solve your paint spray booth problems. Write today.

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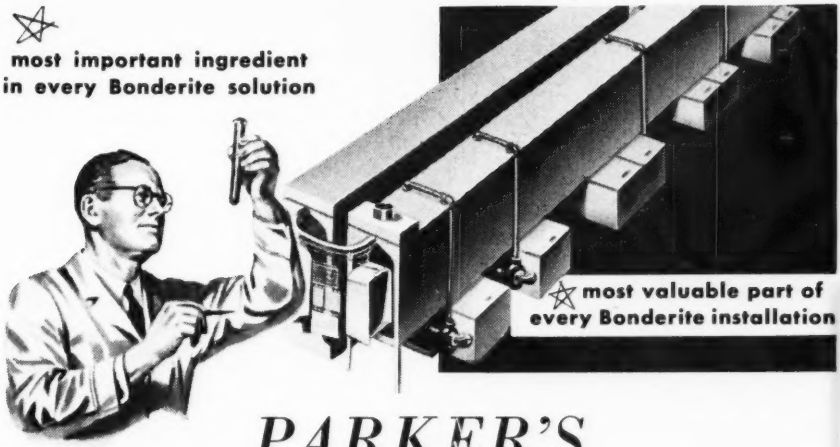


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# 37 YEARS' EXPERIENCE

*in surface treatments for metals*

No one—no individual and no other company—has the experience and knowledge of surface treatments for metals that Parker Rust Proof has.

Backed by this invaluable know-how, Bonderite today is more efficient, more economical, more versatile than ever!

No need to experiment, no need for you to use untried products or methods. Parker, calling on its 37 years of experience, will plan a Bonderite treatment to fit your production requirements exactly and produce the results you want.

Bonderite, corrosion resistant paint base, is one of the most thoroughly proven products available to American industry. And it is sold and serviced by the company which has been the leader in the field since 1915.

Write for detailed information.

PROTECTED BY Bonderite PAINT BASE QUALITY CORROSION RESISTANT

*Bonderite, Bonderlube, Parco, Parco Lubrite —Reg. U. S. Pat. Off.

Since 1915—First in the Field

**PARKER RUST PROOF COMPANY**

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| BONDERITE | BONDERITE and BONDERLUBE | PARCO COMPOUND | PARCO LUBRITE |
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| corrosion resistant paint base | aids in cold forming of metals | rust resistant | wear resistant for friction surfaces |

At the 17th Annual Meeting of the American Hot Dip Galvanizers Association, Inc., the following officers were elected; president, **D. M. HAYES**, Wilcox, Crittenden & Company, Inc., Middletown, Connecticut; first vice president, **FRANK W. MILLER**, Lehigh Structural Steel Company, Allentown, Pennsylvania; second vice president, **T. R. GREGORY**, Thomas Gregory Galvanizing Works, Maspeth, New York; and secretary-treasurer, **STUART J. SWENSSON**.

## MEETINGS

Science and education will be the keynotes struck by the **1952 A.E.S. CONVENTION** and **FINISHING EXPOSITION**, which will be held concurrently **JUNE 16-20**, in Chicago, Illinois.

The educational chairman reports excellent progress on the papers to be presented during the technical sessions during which current problems facing the industry will be fully discussed. The exhibits will demonstrate the progress in science of the industry, by showing step-by-step procedures of finishing processes.

From information received, exhibits will be of fine quality and exceptionally difficult to judge. Prizes to be awarded are:

Branch Exhibits

First Prize .....$ 50.00
Second Prize .....$ 25.00

Individual Exhibits

First Prize .....$100.00
Second Prize .....$ 50.00
Third Prize .....$ 25.00

Special award for the most interesting and unusual exhibit—$50.00

For plant visitations, Bob Greenwell, committee chairman, reports that several plant visits to leading manufacturers and job finishing plants have been arranged. Lists of the plants to be visited will be posted at the registration desk. The number of visitors to each plant will probably have to be limited to 30 or less on a first-come first-serve basis.

Holding meetings coincidentally with the A.E.S. will be the National Association of Metal Finishers, The Chicago Electro-Platers Institute, and the Metal Finishers Suppliers Association, Inc., better known as the International Fellowship Club. John Hilfinger of Toledo, Ohio, president of the N.A.M.F., reports that his group will meet on Tuesday, June 17, 1952, at 1:30 P.M. in the Conrad Hilton Hotel. The International Fellowship Club will entertain its members at a luncheon on Monday, noon, June 16. On Monday night the club will again entertain at their

The Boulevard Room, Conrad Hilton Hotel, where the largest hotel ice show in the country appears nightly.

Here's a part that was cleaned three weeks ago—still rust-free. That's because it was cleaned and rust-inhibited, *all in the same operation*. The secret is Pennsalt Cleaner EC-51, a brand new solvent emulsion cleaner . . . and it can solve some real problems for you. EC-51 is designed to help you on your in-plant cleaning operations. For instance, with EC-51, you can clean one day, and then finish days or even weeks later without worrying about the condition of the exposed metal on the part.

EC-51 won't spot or stain non-ferrous metals, and it gives a rust-preventative surface to steel that protects these parts between processes.

For example, Pennsalt EC-51 has proved itself in one large national company on aluminum, brass, bronze and steel parts . . . cutting their cleaning cost 35% while doing a superior job of cleaning and rust-inhibiting. EC-51 was scientifically designed for thorough removal of heavy grease and oil deposits, buffing compounds, cutting oils and other heavy soils.

Pennsalt EC-51 is something you should look into . . . and our on-the-spot technical representatives will be glad to help you. For further details on EC-51, or any other Pennsalt metal-working chemicals, write Metal Processing Dept.,

**PENNSYLVANIA SALT MANUFACTURING CO.**

EAST: 1000E Widener Bldg., Philadelphia 7, Pa.
WEST: Woolsey Building, 2168 Shattuck Ave., Berkeley 4, Calif.

***Extruding Ordnance Components?***

Pennsalt's new Fos Process offers you a single experienced source for application know-how, superior phosphate coating cycle, and better die protection. Write on your letterhead for more information.

**Pennsalt Chemicals**

***A BETTER START FOR YOUR FINISH***

traditional "Open House" for A.E.S. members and their families.

Convention planning is a big job at any time, and the Chicago Branch is grateful for the excellent assistance and cooperation received from the St. Joe Valley and Rockford Branches through their representatives on the committee:—Mr. Leonard Weeg and Mr. and Mrs. William Geissman of Rockford and Dr. and Mrs. H. J. Wiesner and Mr. and Mrs. Ralph Wysong of St. Joe Valley.

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Plans for the **30th ANNUAL MEETING** of the **FEDERATION OF PAINT AND VARNISH PRODUCTION CLUBS** and the **17th ANNUAL PAINT INDUSTRIES' SHOW**, to be held in Chicago, November 20, 21, and 22, 1952, are rapidly taking shape under the supervision of Dr. Calvin Overmyer, chairman of the Federation Meetings Committee; Eugene Ott, chairman of the Paint Industries' Show Committee; and Howard Sholl, chairman of the Federation Program Committee. A number of very interesting papers have already been promised and outlines of the plan for the Educational and Research part of the program are well underway.

Mr Ott announced that the Paint Industries' Show of 1952 will open in the Exhibition Hall at the Palmer House on Tuesday, November 18, at 10 a. m. This will permit members of the National Paint, Varnish & Lacquer Association, who hold their Annual Convention at the Palmer House on November 17, 18, and 19, to visit the Paint Industries' Show and see the display of materials and equipment for the industry.

## TRAINING COURSES

**THE TECHNOLOGICAL INSTITUTE OF NORTHWESTERN UNIVERSITY,** Evanston, Illinois, and the **BELKE MANUFACTURING COMPANY,** Chicago, announce that starting in September 1952 a cooperative relationship will be established between the University and the company with the purpose of training better qualified men for the electroplating and metal finishing industry.

The cooperative program will comprise twelve school quarters during which various courses in the chemical, mechanical, and electrical engineering departments of the University will be studied. Interspersed with the scholastic work will be six quarters of actual employment in the plant of the Belke Manufacturing Company, manufacturer of metal finishing equipment, in various cooperating plating shops, and in manufacturing plants with large metal finishing departments. On completion of the five-year course the students will be awarded a degree of Bachelor of Science in Engineering.

# meetings

## OF INTEREST TO FINISHERS

**June 16-20. 3rd Industrial Finishing Exposition and 39th Annual Convention, American Electroplaters' Society,** International Amphitheatre, Chicago, Illinois.

**June 23-27. 50th Anniversary, American Society for Testing Materials,** Hotels Statler and New Yorker, New York, N. Y.

**Sept. 10-12. 14th Annual Shop Practice Forum, Porcelain Enamel Institute,** University of Illinois, Urbana, Illinois.

**Oct. 22-24. 21st Annual Meeting, Porcelain Enamel Institute,** Greenbrier Hotel, White Sulphur Springs, West Virginia.

**Nov. 17-19. 64th Annual Convention, National Paint, Varnish and Lacquer Association,** Palmer House, Chicago, Ill.

**Nov. 18-22. 17th Annual Paint Industries' Show,** Palmer House, Chicago, Illinois.

**Nov. 20-22. 30th Annual Meeting, Federation of Paint and Varnish Production Clubs,** Palmer House, Chicago, Illinois.


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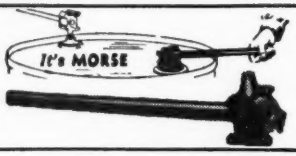
**DRUM PLUG WRENCH**
*Instantly loosens, tightens 95% all plugs or bungs in steel drums.* Has 16" extra-strong steel tubing handle. Wgt. only 2 lbs. Order 1 or more today!

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SATISFACTION GUARANTEED... **$3.00**
Non-sparking type ....$4.60
*Plus Parcel Post*
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## meets every BLACK OXIDE FINISHING *Specification!*

**BLACK MAGIC** — whether applied to civilian or defense production — has proved to be a versatile, economical finish. Its ability to blacken heat treated parts or previously "hard to blacken" items has established **BLACK MAGIC** as a finish capable of exceeding black oxide requirements.

### *Other advantages are:*

- ★ One Bath - One Salt
- ★ Lower Operating Temperature
- ★ Self Rectifying
- ★ Faster Blackening Cycle
- ★ More Corrosion Resistant

### MEETS GOVERNMENT SPECIFICATIONS

57-0-2C type 3; 51-70-1A Finish 22.04;
Aeronautical Material Specifications AMS2485

A comprehensive study of the application of a black oxide finish has been compiled and is now available in our latest catalog. Write for your complimentary copy today.

**Mitchell-Bradford**

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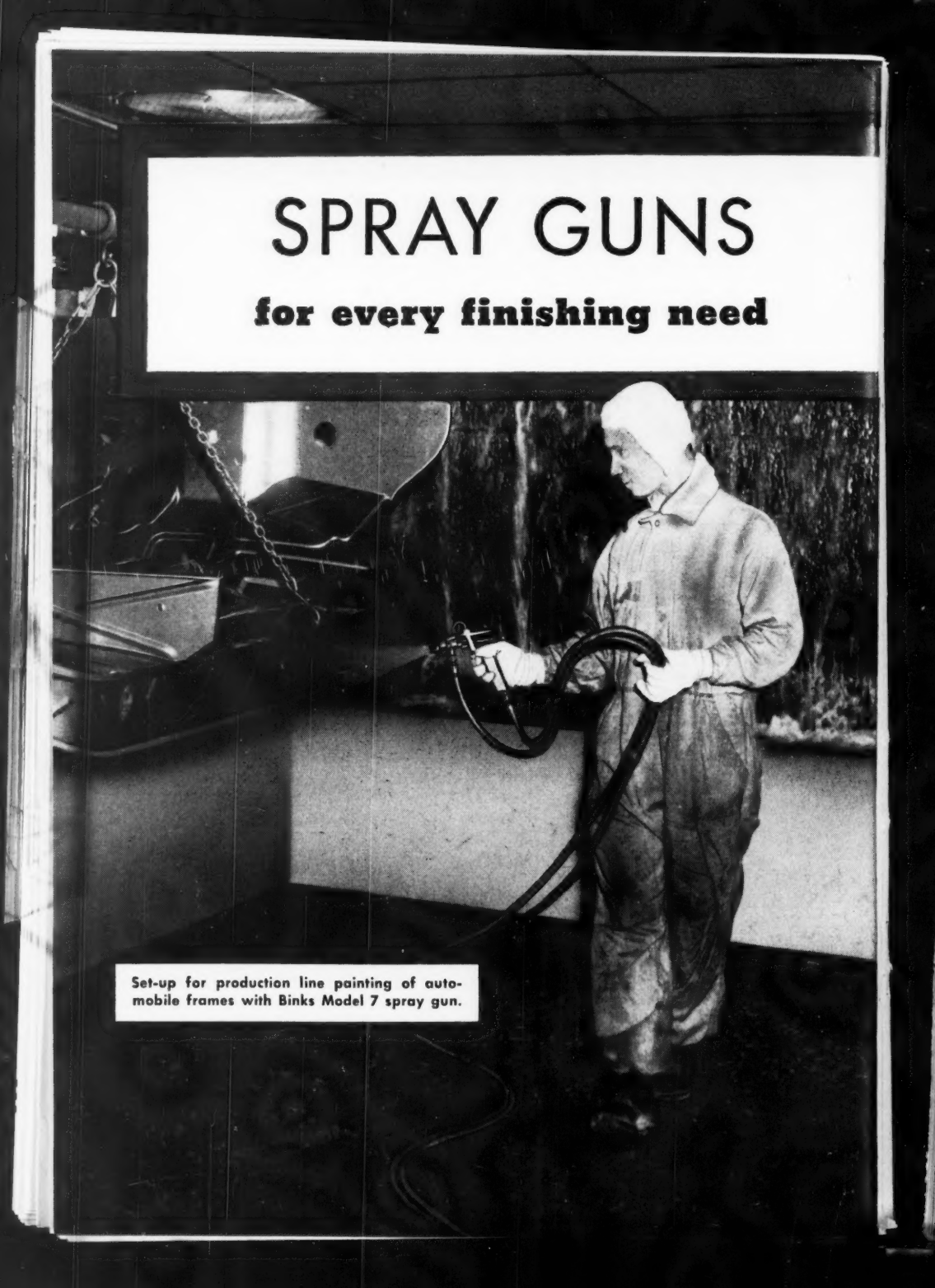
2446D Main St. Stratford, Conn.

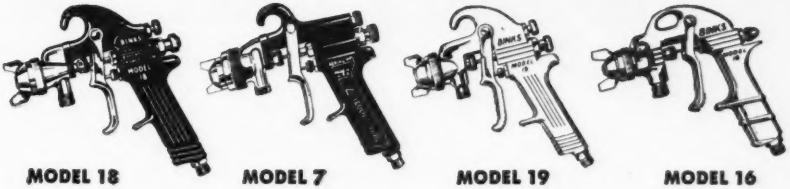
QUALITY PRODUCTS OF CHEMICAL RESEARCH

# SPRAY GUNS

## for every finishing need



Set-up for production line painting of automobile frames with Binks Model 7 spray gun.



MODEL 18 MODEL 7 MODEL 19 MODEL 16

Maybe your job involves a special finish or coating for military equipment . . . or finishing wood and/or metal surfaces on a fast schedule . . . or coating with sound-deadener. Whatever the need, if it involves spraying, Binks has a gun for it . . . more than 36 models with some 1050 nozzle combinations. Here are the four leaders:

- **Model 18**—a precision gun for applying the finest finishes at the lowest cost. Finest gun in the line.
- **Model 7**—a heavy-duty production gun. This is a long-time favorite.
- **Model 19**—a remarkable lightweight production spray gun, using the same nozzles as Model 18.
- **Model 16**—a lightweight gun for fine finishing, feather edging and blending. A favorite with women operators.

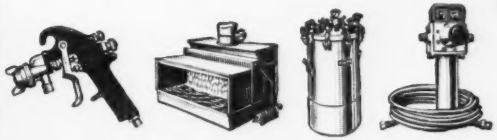
Hiring or training spray gun operators?

**Send for this FREE booklet of painting tips!**

Here's a pocket-size guide to overcoming common troubles in spraying. Trouble and remedy are described in simple, easy-to-absorb words. An invaluable aid to foremen, supervisors, instructors in industry, government, armed forces, etc. As many copies as you need, FREE. Write, on your business letterhead please, for "SPRAY PAINTING HINTS."
Address: Binks Manufacturing Co.,
3118-40 Carroll Ave., Chicago 12, Illinois.

**Binks**

EVERYTHING FOR



GUNS • SPRAY BOOTHS • MATERIAL TANKS • EXTRACTORS & ACCESSORIES

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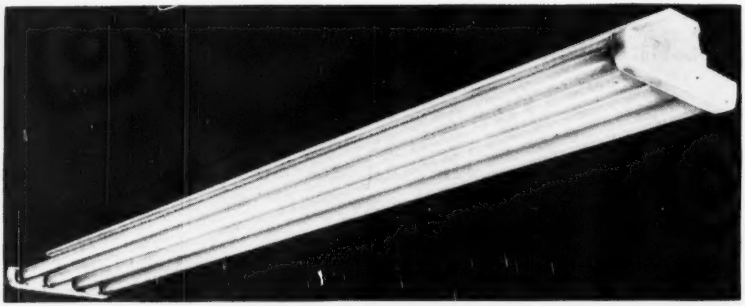
# Finishes

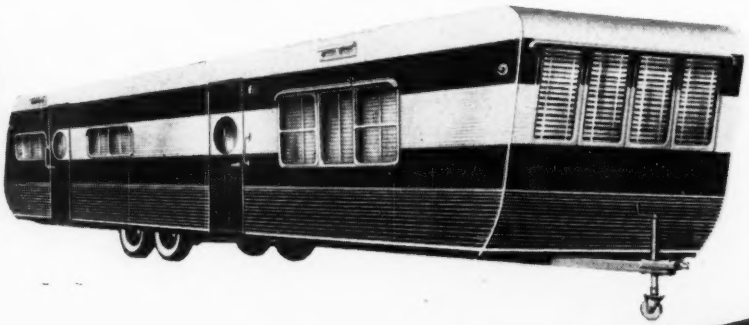


● **The instant-start Slimline fluorescent lighting fixture has been designed primarily for lighting impulse merchandise sold in self-service grocery, drug, and department stores. It is completely finished with Sylvania's Miracoat all-white synthetic enamel.**

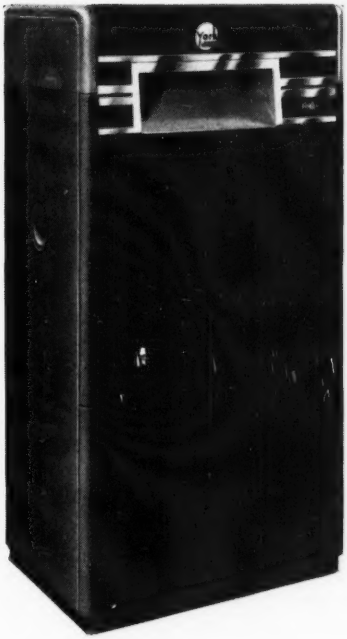
*(Photo courtesy Sylvania Electric Products Inc., New York 19, N. Y.)*

● **The Roycraft Coach's exterior skin is of sheet aluminum. Its finishing process consists of cleaning with Oakite solution, priming with zinc chromate, and painting with synthetic enamel.**

*(Photo courtesy Roycraft Coach Co., Chesaning, Mich.)*



# *that aid in appearance and utility*

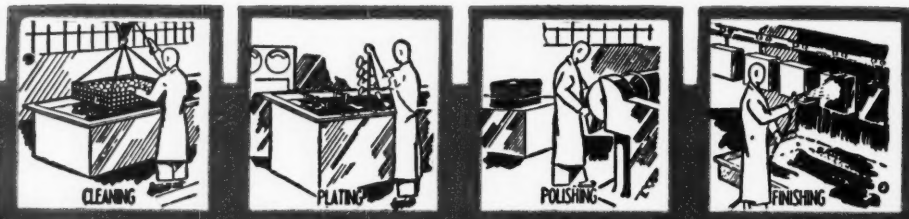


● **The York DER-11 Flakice Machine can produce up to 2,000 pounds of ice in curved chips. The ice handling chute and ice cutter are of stainless steel. The cabinet is made of steel, phosphatized, and finished with a baked grey wrinkle or glossy brown finish. The trim strips are chromium plated.**

*(Photo courtesy York Corp., York, Pa.)*

● **The Universal Motor, rated at 1/40 to 1/12 h.p., weighs two pounds and has a no load speed of 15,000 r.p.m. and a full load speed of 7,500 r.p.m. The streamlined, die cast case is cleaned, receives a conversion coating, and is painted with a wrinkle finish.**

*(Photo courtesy Howard Industries, Inc., Racine, Wis.)*




# New • EQUIPMENT • MATERIALS • PROCESSES

## Model 500 Strato-Belt Machine

Heavy welded steel construction provides a wide range of general grinding and snagging along with flat and contour polishing on the Curtis Model 500 Strato-Belt abrasive belt grinder and polisher, manufactured by the Curtis Machine Division, Lincoln Park Industries, Inc., 1300 E. Second St., Jamestown N. Y. This compact unit requires only 27 x 50 inches of floor space.

The sealed bearing spindle design is said to permit quick interchange of all types of contact wheels such as various widths, contours or special shapes with various durometer neoprene covers, or soft buffing wheels from ½ to 4 inches without special bearings.

The hand screw adjustment of the aluminum idler pulley permits the use of large or small diameter contact wheels, maintaining the same belt length and belt speed for maximum efficiency and cutting.

The abrasive belt being pulled through the grinding instead of being pushed is claimed to eliminate puckering, and to permit true grinding and polishing with increased belt life.

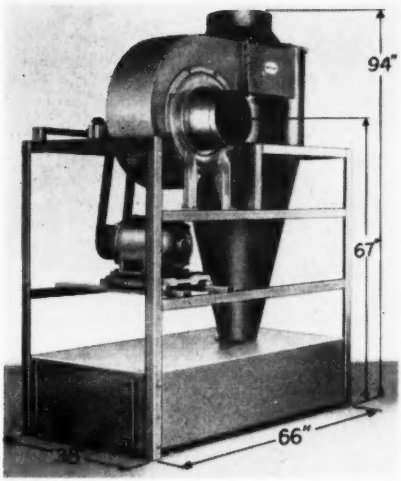
Curtis Model 500 Strato-Belt Machine with belt and dust guards

## Large Capacity Dust Collector

Designated as the "Dustkop" Model 50N60, a self-contained unit type dust collector for use in industrial dust control requiring 5,500 cubic feet of air per minute has been announced by Aget-Detroit Co., 207 Main St., Ann Arbor, Mich. The collector is available as a complete unit with motor-driven fan, cyclone separator, and dust storage compartment.

A feature of the unit is the extremely small floor space requirements in comparison with its capacity; area required is only 34 x 60-inch floor space. The overall height to the top of the sleeve is 94 inches. Both the inlet and outlet sleeves (12 and 16 inches respectively) are sized to fit standard sheet metal pipe.

The Dustkop Model 50N60 is recommended for almost any type of industrial




"Dustkop" Model 50N60 Dust Collector

dust, including lint, and chips generated in grinding, polishing, and buffing operations. It is especially recommended for installations where air containing toxic elements must be discharged out of doors. The Model 50N60 is equipped with a 10 h.p. continuous-duty motor.

## Star Stripper N

Star Stripper N, said to be completely different, has been marketed by the Silver Star Chemical Corp., 58 Watts St., New York 13, N. Y., for the cold stripping of various types of synthetic coatings from aluminum and its alloys that are normally difficult to strip by the cold or hot types of strippers.

According to the manufacturer, the most tenacious coatings are easily removed without attack to the basis aluminum metals.

## Heavy Duty Vapor Steam Cleaner

A heavy duty type steam cleaning machine has been announced by the Topper Equipment Co., Matawan, N. J. The Circo Model 120 Vapor Steam Cleaner operates on a fully-automatic, safety-protected system which enables one-man operation while at the same time accelerating the cleaning process. At the snap of a switch a spark is generated which ignites the burner and puts the machine in action, after which fully-automatic controls maintain the operation at its peak.

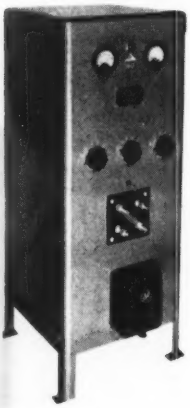
According to the manufacturer, the cleaner is ready for almost instant action with no pre-mixing of the cleaning compound necessary. From the point at which the dry compound is placed in its tank until it emerges as a super-saturated jet of steam from the gun, the whole mixing operation is fully automatic. The solution is fed into the steam stream in the desired strength as selected by the metering valve located on the instrument panel. In this way the heating coils are protected against partial clogging or possible complete obstruction. A specially designed burner which will operate on kerosene No. 1 and No. 2 fuel oil, and light diesel oil, contribute to savings in time and manpower, it is stated.

The Circo is available in stationary or portable models of 120-gallon capacity. The portable unit is mounted on a free-rolling carriage designed for rugged use. It is supplied with a multi-purpose balanced swivel type cleaning gun with gun control shut-off. A specially designed, easily removable swivel front section permits the connection of any of the various alternate attachments without stopping the motor.

Circo Model 120 Heavy Duty Vapor Steam Cleaner

## "Lektron" D. C. Power Supply

Electronic Rectifiers, Inc., 2102 Spann Ave., Indianapolis 3, Ind., has announced its D. C. Power Supply that can be used for electroplating, cleaning, laboratory testing, and many other uses where a dependable source of d. c. power is required.



"Lektron" D.C. Power Supply

The unit operates on a. c. line voltages of 208 to 230, three phase, 60 cycles. It supplies either 500 amperes at 3 to 7 volts d. c., or 250 amperes at 6 to 14 volts d. c. This is a full wave unit with a ripple voltage of approximately 4½ per cent under load. The d. c. voltage does not drop to zero when a single tap position is changed under load, it is claimed.

The unit is equipped with "Lektron" magnesium copper sulphide rectifiers that can be operated at temperatures from -40 to 284 deg. F. It is not affected by atmospheric conditions, and over a long period of time has been proved to be rugged mechanically and electrically.

Cabinet size for the D. C. Power Supply is 17 x 17 x 45 inches, and includes an a. c. contactor with thermal overload relays and an on-off switch; d. c. voltmeter; d. c. ammeter; three current selector switches; and convenient d. c. terminal panel.

## Aluminum Tinting Paste

Greater two-tone, flash, and glamour for polychrome or metallic finishes are possible through the use of an aluminum paste made by the Aluminum Company of America, 801 Gulf Bldg., Pittsburgh 19, Pa. Designated as Aluminum Tinting Paste No. 222, it provides an exceptionally bright finish, does not interfere with true color values, and gives a "clean" appearance of great depth to the finish.

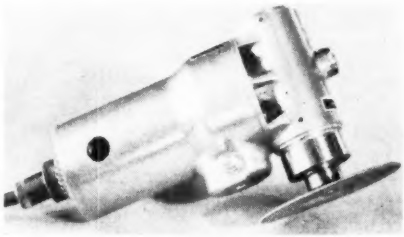
While primarily intended for automotive finishes, the Alcoa paste also imparts a striking, beautiful effect to the hammer-tone finish on household equipment and appliances, it is stated. Very pleasing effects can be obtained when used in non-smudge aluminum colors.

## Diskette Grinder

The Balmar Corp., Woodberry, Baltimore 11, Md., has introduced the Diskette, a lightweight, high-speed disk grinder for one-hand operation, with a speed of approximately 8,000 r.p.m.. The precision instrument, which is designed to withstand continuous duty, grinds, sharpens, and shapes all metals. The speed efficiently produces smooth finishes and highly polished surfaces, it is stated.

The Diskette weighs 4½ pounds and is 9 inches in overall length. It has a universal motor of 110 volts, a.c. or d.c., is housed in an aluminum alloy casting, and is furnished with three composition disks, 4 inches in diameter and $\frac{3}{32}$-inch thick, of No. 36, 80, 120 grit, as well as a screw driver and a $\frac{3}{16}$-inch pin wrench. A double-action push-button switch, conveniently operated by a finger of the hand holding the Diskette, controls the motor. The manufacturer states that Diskette's one-hand operation compares with the two-hand operation most commonly employed.

Eight special attachments, which are available separately, include an aluminum safety guard, a flexible rubber disk with adapter to back recessed aluminum-oxide disks, rubber pads for adhesive-coated abrasive disks, a hole-burring stud, a hole-polishing stud, a collet chuck to hold a variety of files, cutters, buffing wheels, and so on, a spindle to hold rotary files and rasps, as well as a bench stand which permits use of the Diskette as a bench grinder.



Balmar Diskette Grinder

# NOW-Get All These Advantages of a NON-FOAMING WATER WASH

## PELRON'S CLEARWASHES WILL NOT FOAM!

CLEARWASH 370 used in water curtain spray booths will float over 90 percent of the oversprayed paint, as well as eliminate foam in the spray booth. Oversprayed paint is conditioned not to clog the circulating system nor to adhere to the booth walls. Economical in that its first cost is low, a little goes a long way, and much expense is saved in cleaning reservoirs, pipelines, booth walls, etc. Details in Technical Bulletin 129.

## ARE YOU ACQUAINTED WITH PELRON'S AIDS AND SERVICES TO THE FINISHING DEPARTMENT?

**EMULSION CLEANERS**
New principal — partly emulsified soil floats away. Fast, economical, safe.

**STRIPPERS**
Cold stripping of lacquers, japan, baked enamels. Fast, safe, economical.

**PHOSCOTE**
Cleans and phosphates in one operation. Economical to use on steel or aluminum. Increases paint-adherence.

**TECHNICAL BULLETINS**
Complete details of application methods for all cleaning and surface preparation materials.

## TELL US YOUR PROBLEMS . . . WE WILL RECOMMEND THE CORRECT PELRON PRODUCTS TO SOLVE THEM

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MILWAUKEE • INDIANAPOLIS • ROCK ISLAND

## All-Purpose Barrel Burnishing Compound

A barrel burnishing emulsion that is said to be a great advance in lustering compounds has been developed by the Blue Magic Chemical Specialties Co., 2135 Margaret St., Philadelphia 24, Pa. Known as Blue Magic No. 0-221, the compound produces a beautiful hand buffed appearance in any metal with any tumbling medium and in any standard barrel finishing equipment suitable for wet tumbling. It may be used repeatedly.

According to the manufacturer, the compound will coat a cutting medium and make it a burnishing medium. If lustering is needed, it will deliver a brillance of finish that is hard to detect from that produced by careful hand buffing.

Blue Magic No. 0-221 mixes readily with water, has no objectionable odor, and is non-irritating to the skin. It can be removed completely from cutting or other work by a simple water rinse.

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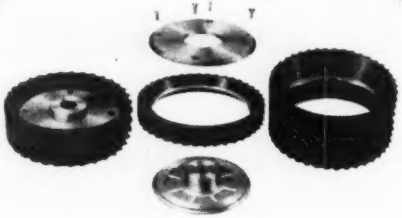
## Universal Hub Contact Wheel

Designed to reduce contact wheel costs, a universal hub contact wheel, announced by The Carborundum Co., Dept. PF, Niagara Falls, N. Y., consists of a three-part bolted metal assembly which includes a flanged universal hub, a T-61 serrated rubber tire, and a side plate. The tire, when worn out, is discarded and replaced by another at half the cost of a standard new contact wheel replacement, it is claimed.

A single universal hub and plate unit is said to mount a variety of T-61 rubber tires of from ¼ to 6 inches in width and from 5 to 105 durometer in hardness. This feature of interchangeability means that a single universal hub will accommodate up to 144 different tires of varying width and/or durometer. The interchangeable feature thus permits the performance of operations ranging from rough belt grinding down to the finest finish grinding on flat surfaces or contoured parts employing the same basic universal hub without removing the hub from the spindle. Each part of the universal hub assembly—hub wheel, plate, and tire—is separately balanced. Thus, all hubs, plates, and serrated rubber T-61 tires are not only interchangeable but are in balance in any combination of assembled contact wheel units.



Exploded view of Carborundum Universal Hub Contact Wheel

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## Hermetically Sealed Selenium Rectifiers

International Rectifier Corp., 1521 E. Grand Ave., El Segundo, Calif., has announced its line of hermetically sealed selenium rectifiers in metal cases filled with inert gas and provided with standard tube terminals to fit standard sockets. All standard tube mountings are available.

According to the manufacturer, this type of hermetically sealed assembly has the advantages of complete protection against corrosive atmospheres, moisture, salt spray, and fungus and, at the same time, provides for dependable service in applications where quick replacement is essential.

Model No. W15CM Hermetically Sealed Selenium Rectifier

The unit illustrated, No. W15CM, is rated at 390 volts r.m.s. input; 550 volts peak inverse; 120 milliamperes, 160 volts d. c. output at 35 deg. C. ambient.

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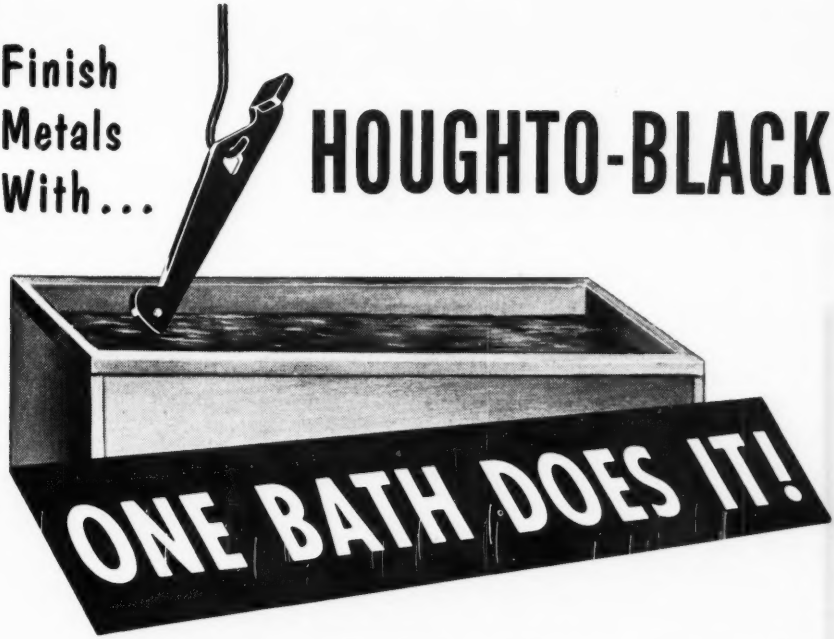
## Volume Delivery Material Pump

Advantages of the large paint circulating systems used in major industries' spray painting divisions now are avail-

# Finish Metals With... HOUGHTO-BLACK




**LASTS LONGER!** The Houghto-Black finish is tough—long-lived—yet so thin it won't alter dimensions of close-tolerance parts! Gives them a handsome jet black finish.

**PROTECTS BETTER!** Houghto-Black coats metals uniformly—even steels of different analyses finished at different times!

**COSTS FAR LESS!** A one-bath treatment, Houghto-Black is inexpensive. Ordinary tanks are used for dipping parts. And it's applied to mass production without special equipment!

HOUGHTO-BLACK
. . . a product of

E. F. HOUGHTON & CO.
PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO

*Get latest bulletin by writing E. F. Houghton & Co., Philadelphia 33, Pa.*

*Ready to give you on-the-job service . . .*

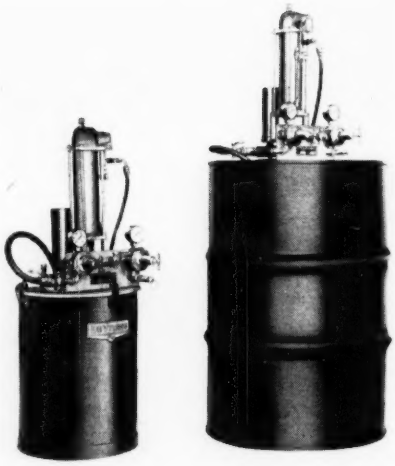
able for smaller scale maintenance painting, production finishing, and coating operations with the Type P-QBD Volume Delivery Material Pump, introduced by The DeVilbiss Co., Toledo, Ohio.

Two models of the pump are being produced, one designed for use with common types of 55-gallon drums, while the other is equipped with a ten-gallon hinged lid tank into which a standard five-gallon paint container can be fitted. Both models are adapted for simple direct hose line connections, with which as many as six spray guns can be operated directly from a single pump in maintenance and production finishing operations.

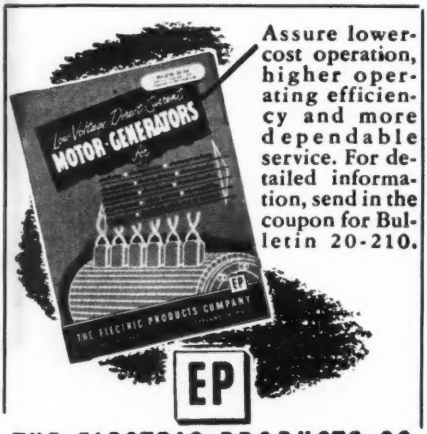
A feature of the P-QBD models is the automatic by-pass valve which enables the pump operator to maintain paint mixtures at correct consistencies and permits fluid pressure control.

Among the advantages of the models stressed by DeVilbiss is flexibility of location. Pumps and material supply may be located in supply rooms or other spots.

The P-QBD can supply as much as 25 ounces of material per minute to eight spray guns in a steady, uniform flow with the pace of pump operation controlled by the operating rate of the spray guns. They are capable of delivering the heaviest bodied fluid materials to high elevations and through considerable length of hose or pipe, developing up to 200 pounds material delivery pressure.



DeVilbiss Volume Delivery Material Pumps


Assure lower-cost operation, higher operating efficiency and more dependable service. For detailed information, send in the coupon for Bulletin 20-210.

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X-78


## Chek-Spek Inspection Method

Development of a high-speed dye penetrant inspection process, designated as Chek-Spek, has been formulated by Turco Products, Inc., 832 E. 62nd St., Los Angeles 1, Calif. Non-toxic and non-flammable, it is claimed to permit accurate evaluation of an almost unlimited number of inspections per hour.

When used in conjunction with a vapor degreaser, Chek-Spek requires only two materials — Chek-Spek Penetrant and Chek-Spek Developer. Following precleaning by a vapor degreaser, the red Chek-Spek Penetrant is applied to those parts being inspected. After being allowed to dwell sufficiently long for it to enter even the smallest defect that extends to the surface, the surface dye is removed by suspending the parts for a few seconds in the vapor zone of a vapor degreaser. Following dye removal, the white Chek-Spek Developer is sprayed onto the parts being inspected. Strong Developer capillary attraction pulls out the dye which has remained trapped in existing flaws. As the white Developer dries, the red dye bleeds into it, clearly locating and de-

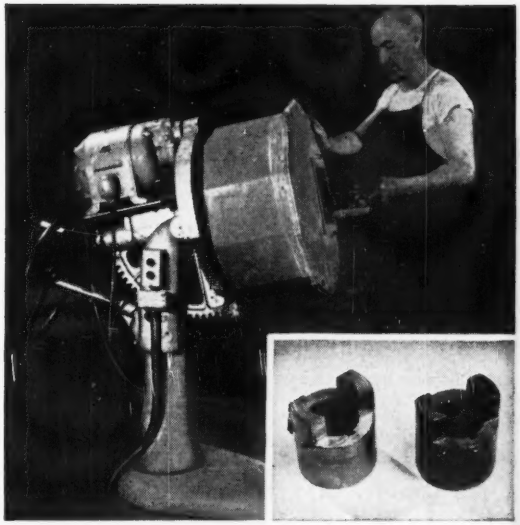
# DEBURRING PRODUCTION *increased* 85%

## AT BAKER-RAULANG

**Leading Manufacturer Of Electric Lift Trucks**

*with*

# GLOBE TILTING TUMBLING BARRELS

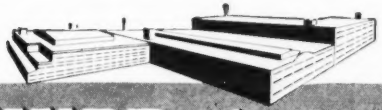


Insulating bushings were formerly deburred with emery wheels at a rate of 300 per hour. With use of a Globe Tilting Tumbling Barrel, production was stepped up to 2000 pieces per hour. In addition to an 85% production increase, the tumbling barrel released two men for work in other departments.

Extra economies are obtained by tumbling odd shaped pieces difficult to deburr with hand wheels. With the Globe Tumbling Barrel, Baker-Raulang has doubled deburring production, and is obtaining finer finishes, using only 3 men in place of 5 men formerly required.

**FREE EXPERIMENTAL SERVICE**

Let Globe's experimental engineering service analyze your finishing problems. Send samples of parts and completed piece to show finish desired and Globe will provide detailed finishing recommendations. Write today! No obligation, of course.



**HUPP CORPORATION**

**GLOBE STAMPING DIVISION**

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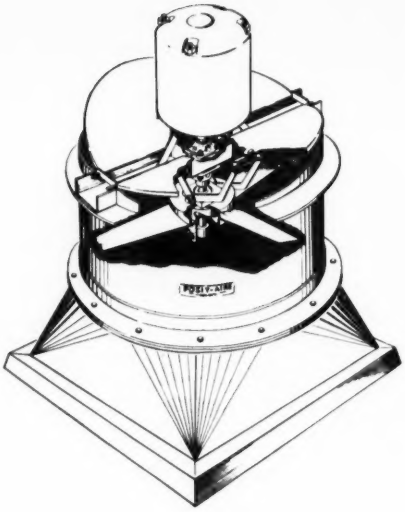
fining the extent of existing flaws.

Easy to use, Chek-Spek is applicable to both ferrous and non-ferrous metals. While it is recommended that the Developer be sprayed onto the surface, it can also be applied by dip or brush.

## Posit-Aire Power Industrial Ventilator

Because of minimum restriction to impede air flow, the Posit-Aire roof-type ventilator, product of Tripar Products, Inc., 14641 W. Eleven Mile Rd., Royal Oak, Mich., moves maximum volume of air in range of 5,000 to 45,000 c. f. m. depending upon size. The instant the fan is started, mechanically-actuated louvers open fully and automatically. When the fan is stopped, the louvers close and lock in closed position until the unit is turned on again. According to the manufacturer, this automatic louver design prevents entrance of rain or snow, eliminates drafts or "stack effect" when the unit is not operating, and prevents back-draft or entrance of outside air. It offers reduction in fire hazard by eliminating draft through roof in event of a fire. Engineered for field erection, the unit can be supplied without motor or base. Interiors and mechanism can be supplied with protective coatings for moisture and corrosion protection.



Posit-Aire Power Industrial Ventilator

## Leafcote

Mid-America Steel Warehouse, Inc., of Chicago, Illinois, has developed a coating, designated as Leafcote, for the protection of steel sheets against corrosion and excessive heat.


**For Quality and Uniformity Specify**

**HARRISON 4A PRODUCTS**

**STAINLESS STEEL BUFFING AND POLISHING COMPOUNDS**

**Faster Cutting—Increased Production —Economy**

**Glazing Compounds**
**Compounds for Spraying Or Dipping**

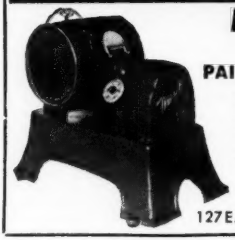
Use 4A Cement and Thinner—For Setting Up Wheels, Belts, Rolls, etc. — Longer Life — Greater Production.

*Consult Us On Any of Your Problems. We'll Gladly Advise and Send Samples.*

**HARRISON & CO., INC.**
**Haverhill, Mass.**



**PAINT MIXER**



**MIRACLE**
**5 GALLON PAINT REJUVENATOR**
All paint restored to original consistency without opening the can.
*2 minutes per gallon.*
**MIRACLE PAINT REJUVENATOR CO.**
127 E. 9th St., St. Paul 1, Minn.

# Superb

Distinctive finishes prepared by our Creative Studio are superb, too! They have individuality . . . attention arresting characteristics . . . sales appeal. Our highly skilled staff of artists conscientiously incorporate their experience and know-how to produce coatings that do a real selling job. We suggest you avail yourself of their creative abilities.

Reputable firms are invited to send samples to be finished . . . no cost or obligation.

*No Tampering with Quality*

*Affiliate*
**GORDON BARTELS CO.**
*Roller Coating Specialists*

**ROCKFORD VARNISH** *Company*
ROCKFORD, ILLINOIS
*Manufacturers of Protective and Decorative Coatings*

After both sides of either a cold or hot rolled steel sheet have been degreased, pickled, and phosphatized in Mid-America's plant, they are heated, after which Leafcote is bonded and baked on for toughness and lasting adhesion. The formula can be used as a prime coating, or it can be finished in any color desired. In addition, the process draws and forms without peeling or cracking, it is claimed.

## Columbia Volt-Ammeter

The Columbia Type AC-1 Volt-Ammeter, a clamp-type, hand-sized measuring instrument that does two separate jobs—measures volts and amperes—instantly and accurately, has been announced by the Columbia Electric Mfg. Co., Dept. PF, 4553 Hamilton Ave., Cleveland 14, Ohio.

Readings are made without breaking circuit or insulation. To read amperes, a convenient trigger is pressed, opening the pair of insulated jaws so that they can be easily encircled around the power cable or bus bar. The jars will accommodate cables up to 1½ inches in diameter and bus bars up to 2 x ½ inch. Four amperage ranges are available: 0-12, 0-60, 0-120, and 0-600 a.c. amperes.

## Circular Chart Controller

An electronically - operated circular chart controller which can control industrial processes according to time-temperature schedules has been developed by Minneapolis - Honeywell Regulator Co., Brown Instruments Div., Wayne & Windrim Aves., Philadelphia 44, Pennsylvania.

In instances where both time and temperature control are important for product quality and efficiency of operation, the instrument has an integral-program cam mechanism which automatically positions the instrument control point in accordance with a predetermined program.

This instrument combines measurement and recording on a 12-inch chart; automatic positioning of the set point index as directed by a transparent program cam; and automatic program control of the variable. The standard Brown Continuous Balance system is used for measurement. It is available in both electric and pneumatic control.

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You'll get a cleaner surface with the improved DETROIT HANDY "TAC" RAG. Standard of your FINISHING INDUSTRY for 17 years. Removes all particles of dust, lint and sand. Non-inflammable! Order from your supplier today, or send for sample.
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DETRO MFG. & SALES CO., INC., CULVER CITY, CALIF.


## Nu-Pon Primer

Nu-Pon, an alkali-resisting primer which provides greatly increased surface protection, has been announced by the Glidden Co., Cleveland 2, Ohio. Developed primarily for the laundry appliance industry, new uses are now being exploited.

According to Glidden, two-coat finishing systems for appliance exteriors employing Nu-Pon Primer, followed by a conventional top coat enamel, are capable of withstanding four to ten times the exposure to alkaline washing solutions. Additional savings in material may be made by flow coating this primer.

## Roller Tray Infra-Red Oven

Wil-Son Manufacturing Co., Dept. PF, Cloverport, Ky., has announced its Roller Tray Infra-Red Oven which gives conveyorized production without conveyor equipment. Adaptable for the production of small parts and medium production of larger sized parts, it is ideally suited to baking of synthetic enamels and lacquer

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Roller Tray Infra-Red Oven

finishes, and drying of electroplated parts.

Asbestos insulated construction together with heat-conserving baffles at the oven entrance guarantee maximum production efficiency, it is claimed. All sockets are wired with asbestos wire, and each channel row is equipped with a toggle switch for individual control.

Standard oven lengths are 24, 32, 48, and 96 inches, and the size of the oven can be increased at any time by additional oven sections. The tray is constructed with steel wheels having ball bearings and will support 50 pounds of weight.

## Chrometeseal

A method of treating solder-metal surfaces to eliminate the formation of pits and blemishes in paint finishes has been developed and is available commercially from the Cook Paint & Varnish Co., 3301 Bourke Ave., Detroit 21, Michigan.

The composition is applied to permanently fill and seal minute imperfections in solder-metal surfaces, ensuring against breakthroughs or eruptions of the paint finish.

After each coating the product passes through baking ovens, with the heat usually supplied by gas-fired convection-type ovens, or banks of infra-red bulbs. In addition, the primer surfacer coats, after baking, receive a water sanding operation to obtain a final smooth surface.

Applicable to major household appliances, cars, or buses, in which welded joints are filled with solder metal to provide a smoother finish, the Chrometeseal process consists of first applying a solution made of alcohols, acids, and distilled water. The second step is the application of the Chrometeseal filler material, which is essentially a mixture of finely ground metals and pigments suspended in alcohol for application purposes. This procedure fills the cavities with a mixture of the two solutions, the resulting reaction bonding the metal and pigment powders to leave a firm continuous film, remaining porous enough to allow the foreign matter to exude through the film.

## Chem-Dry Process

The Meyercord Co., Chicago, Ill., has designated H. L. Barnebey, P. O. Box 144, Pittsburgh 30, Pa., as exclusive licensing agent for its Chem-Dry Process for hardening paints, varnishes, and inks. By this technique protective and decorative coatings are hardened in a few seconds. According to the manufacturer, heavy coatings can be applied and the coated material can be stacked or packaged directly from the machine.

In the Chem-Dry Process the coated material is conveyed through a chamber where it is brought in contact with sulfur

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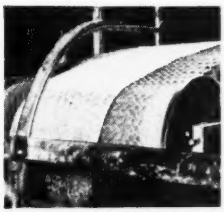

This typical Cambridge belt installation moves galvanized sheet from the pot through cooling and finishing.

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Department A
Cambridge 5, Maryland

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dichloride vapor which reacts with the drying oil in the coating to give a completely hardened product in a few seconds. The process is simple in principle and in actual plant operation, it is claimed. No heat or solvents are employed, and the equipment takes little space.

## PRODUCT LITERATURE

*The publications listed in this section may be obtained free upon written request on company letterhead to the manufacturers concerned. Your courtesy in mentioning PRODUCTS FINISHING when requesting copies of these publications will be sincerely appreciated by the manufacturer and the publisher of this magazine.*

**Sisalin Sections for Combined Buffing and Polishing.** Hanson-Van Winkle-Munning Co., Matawan, N. J., is offering a two-color bulletin on Sisalin Sections for both buffing and polishing. These sections, available with special stiffening impregnation for added cutting properties, can be combined to form wheels of any desired thickness.

**Bulletin SS-100** tells how Sisalin Sections of unbleached muslin and sisal can be used for eight different polishing and buffing operations; gives diameters, thicknesses, and sewing specifications; and includes field performance information.

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**Plating Barrels.** Belke Manufacturing Co., 947 N. Cicero Ave., Chicago 51, Ill., has released a catalog which describes plating barrels of all types and sizes with auxiliary equipment and accessories. Also included is a modern layout for plating production.

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**Acid Proof Brick Floors.** The U. S. Stoneware Co., Akron 9, Ohio, has prepared 16-page two-color **Bulletin AB17** which describes in detail how to construct acid proof brick floors. The bulletin describes the uses of acid brick, the application of different types of cement, and shows detailed drawings of various types of floors, as well as actual installation photos. Complete instructions and answers to typical questions on flooring are also covered.

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**Enamelstrip Coated Coil.** Advantages of Enamelstrip, the metal coil pre-coated in color, are colorfully illustrated in a four-page folder issued by The Coated Coil Corp., 517 W. 30th St., New York 1, N. Y. In addition to an actual sample of Enamelstrip, the bulletin lists the metals which will be coated and precision slit to individual specifications.

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**Rustshield 2,** a chemical treatment that produces an oil-retaining rustproof surface for moving metal parts, is described in a four-page publication by Octagon Process, Inc., 15 Bank St., Staten Island 1, N. Y. Attractively printed in two colors, the booklet discusses application methods and advantages of using Rustshield 2 on sliding and bearing surfaces. A great variety of precision parts and defense components are given this treatment to meet U. S. Army Ordnance Specification


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**Electrolytic Motor-Generators. Bulletin 20-210** describes in 14 pages with 43 illustrations a complete line of low-voltage, direct-current motor-generators for electrolytic processes. Not only are both sleeve-bearing and ball-bearing constructions presented, but also a short history of the development of today's electrolytic motor-generators and several electroplating fundamentals. Copies of the bulletin are available from The Electric Products Co., 1725 Clarkstone Rd., Cleveland 12, Ohio.

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**Water Repellent.** The Building Maintenance Division of the Flexrock Company has published a four-page bulletin on "Flexseal," its silicone-base water repellent said to provide excellent results not only on brick and concrete surfaces but also on sandstone, asbestos-cement combinations, and other surfaces. The bulletin covers in detail the advantages of Flexseal.

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Technical data and instructions for application are included in the bulletin, which is printed in two colors throughout and is amply illustrated. Copies may be obtained by writing the Building Maintenance Div., Flexrock Co., 36th and Filbert Sts., Philadelphia 4, Pennsylvania.

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**Steam Generator.** Issued by the Clayton Manufacturing Co., El Monte, Calif., is a fully-illustrated booklet on the automatic, self-contained Clayton Steam Generator. Details are given on specific industrial applications of the equipment for automatically supplying a dependable volume of steam at constant temperature and pressure, and the use of single and multiple installations is described. Charts and cutaway drawings illustrate the efficiency of steam generation which is made possible by the application of the forced recirculation principle. Operational data and information on the models and sizes of the Clayton Steam Generator are also presented.

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The Hanson-Van Winkle-Munning Co., Matawan, N. J., is offering a revised bulletin entitled **"Cleaners for Effective Metal Cleaning,"** which will be of interest to all those concerned with cleaning metal prior to applying decorative or protective coatings.

The brochure, **Bul. C-107,** first defines six different methods of metal cleaning. Next, a table lists which cleaners to use for various metals and their alloys. Following are sections devoted to soak cleaners and electrocleaners. The former lists seven types of cleaners and gives the applications, recommended concentration, and temperature range; the latter lists 15 cleaners and gives their application, recommended concentration, current density, and temperature range.

Concluding the bulletin are sections on spray washing machine cleaners and specific purpose cleaners. The spray washing machine section lists three cleaners and gives their applications. The section on specific purpose cleaners includes four acidic types, two solvents and two aluminum etchants.

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**Technical Data Sheet No. 21** on MacDermid Aluminum Bright Dip, an acidic material used to give a luster to most types

of non-silicon aluminum alloys, may be obtained from MacDermid Incorporated, Waterbury 20, Connecticut.

Complete details are given in the data sheets as to equipment, such as type of tank, ventilation equipment and heaters; operation condition, including solution make-up, temperature, and rinsing; replenishment, and chemical control.

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**Selenium Rectifiers.** Bart - Messing Corp., 229 Main St., Belleville, N. J., has available **"A Guide to Better Plating Power"** which presents the complete line of Sel-Rex Selenium Rectifiers with descriptions, drawings, and photographs.

All types of rectification to provide direct current power for every electroplating, electropolishing, electrocleaning, and electrochemical need are clearly described.

---

**Aids for Maintenance.** Industrial maintenance, safety, and process engineers will be interested in the AIDS offered by the Aviation Industrial Div., Fine Organics, Inc., 211 E. 19th St., New York 3, N. Y. Technical and practical data, relative to the nature and uses of Fine Organics

For more complete information on products and processes use READER SERVICE CARDS inside covers.

"FO" line of solvents, cleaners, and emulsions are briefly yet lucidly described. AIDS bulletins available are: **Emulsion Cleaners,** Vol. 1-2; **Safety Solvents,** Vol. 1-4; **Supplementary Technical Information,** Vol. 1-5; and **Instrument Cleaners,** Vol. 1-6.

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**Plant Maintenance Digest.** A newly-revised edition of the Oakite Plant Maintenance Digest, reviewing materials and methods for performing 54 maintenance cleaning and related tasks in factories and mills, has been announced by Oakite Products, Inc., 120 Rector St., New York 6, New York.

After first stressing the importance of careful selection of the correct material for each operation, as well as determining the most efficient method of application, the Digest recommends specific materials and methods for each of the jobs discussed. The helpful job data provided, based on the successful experience of leading plants using the materials and procedures described, are designed to help operators in obtaining maximum benefits from plant maintenance programs.

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**Industrial Heating Equipment.** A 16-page brochure in two colors containing valuable reference information on industrial heating problems and telling how Jensen Pan-L-Heat Ovens may be used to reduce process heating costs is available from Jensen Specialties, Inc., 9331 Freeland Ave., Detroit 28, Michigan.

Of interest to all users of industrial ovens and furnaces will be the helpful table titled "Steps in Selecting Industrial Heating Equipment." The brochure elaborates on each of these steps, giving the latest, never-before-published data that have been assembled by Jensen engineers. Among them are sections on the selection or appraisal of methods of material handling, typical temperature cycles, new methods of heat application, available fuels, and auxiliary equipment. Other sections outline the company's engineering service, and charts and tables are provided so that readers may develop answers to their own heating problems.

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A 20-page booklet entitled **"How Thousands of Plants Cut Costs"** is available from The Fostoria Pressed Steel Corp., Fostoria, Ohio.

Profusely illustrated with installation photographs and diagrams of the company's line of infra-red ovens, detailed information is given on types of heating such as convection and radiation methods, infra-red lamps, and necessity of air exchange and air control. Special attention is given to gold reflectors; their construction, usability, economy, and rating with respect to other reflectors.

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**Sheet Metal Catalog.** A "broadview" catalog covering the sheet metal designing and producing facilities of the Burdett organization may be obtained from the Burdett Manufacturing Co., 3433 Madison St., Chicago 24, Illinois.

The 12-page, colored, well illustrated catalog covers the gas-fired "Radiant Heat" heaters as well as ovens, air make-up units, spray booths, and washers.

---

**Protection for Aluminum.** A six-page descriptive folder has been released by the American Chemical Paint Co., Ambler, Pa., which discusses Brush Alodine and its application with simple hand equipment. The pamphlet lists a number of descriptive facts and advantages of this coating.

For all fine finishes Use
TACK "Magic" RAGS
WM. A. JUERGENS CO. Write for Sample 4036 LAGRANGE ST. TOLEDO, OHIO

**Infra-Red Radiant Heaters.** A six-page bulletin, available from the Edwin L. Wiegand Co., 7552 Thomas Blvd., Pittsburgh 8, Pa., describes, with many illustrations and drawings, ten advantages of using radiant heaters. Also included are tables of specifications for lamps and input controllers.

---

**"Hot Spraying of Automobiles"** is the title of an eight-page booklet which presents a brief discussion of the theory and practice of the Hot Spray Process as applied to automotive refinishing. Advantages and the use of hot spray are among the topics taken up.

The booklet may be obtained from Bede Products, Inc., 1110 Brookpark Rd., Cleveland 9, Ohio.

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**"The History and Development of Ferrolum Lead Clad Steel and Cupralum Lead Clad Copper"** is the title of a 24-page booklet available from Knapp Mills Inc., Research Dept., 23-15 Borden Ave., Long Island City 1, New York.

Printed to review the history and development of the use of lead and to bring to attention the full technical information on the latest developments and improvements in the use of lead, the illustrated booklet presents detailed information and much data. One of its chapters is devoted to the use of electro - cupralum anodes in chrochromium plating.

**Barrel Finishing Compounds.** An illustrated catalog listing various Blue Magic products and their characteristics, applications, and advantages is available from the Blue Magic Chemical Specialties Co., 2135 Margaret St., Philadelphia 24, Pa. Included are special purpose compounds in concentrated paste and powder forms for deburring, cleaning, polishing, burnishing, and lusterizing non-ferrous and ferrous metal castings, stampings, and other parts or products that can be barrel tumbled. In addition to presenting case histories, the catalog presents the offer of the company's laboratory facilities for trial runs and working samples for test.


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*See your nearest Du-Lite Field Engineer or write for more information.*

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METAL FINISHING SPECIALISTS

**Machine Cleaning of Metal.** Oakite Products, Inc., 120 Rector St., New York 6, N. Y., has announced the publication of a 16-page illustrated booklet, **"8 Things to Look for When You Wash Metal by Machine."**

The booklet reviews specialized materials available for use in metal-washing equipment and tells in detail the jobs they do. In connection with the selection of detergents for use in metal-washing machines, the booklet provides helpful data on the many factors to be considered. The booklet also describes the equipment available to promote efficient operation of metal-washing machines by simplifying determination of correct solution strength, operating temperature and upkeep, so that waste of cleaning materials is avoided.

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**RP Paint Arrestors.** A 12-page catalog is available from Research Products Corp., 1015 E. Washington Ave., Madison 10, Wis. Well illustrated with photographs and schematic diagrams, the booklet gives examples of varied applications of RP Paint Arrestors.

The first section defines the equipment and its advantages. Another section gives detailed information, together with necessary formulas, for planning and installation. There is also a table devoted to evaluation data.

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**Open Channel Flow Meters.** Released by The Bristol Co., Waterbury 20, Conn., is **Bulletin No. F1606,** which describes its Series 500 line of Open Channel Flow Meters. Discussed is the application of the instruments to the measurement of the flow of water, sewage, industrial effluent, irrigation water, and other liquids through weirs and flumes of all types.

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**Modern Spray Finishing Equipment,** a 64-page general catalog, has been compiled by the M & E Manufacturing Co., 2567 Winthrop Ave., Indianapolis 5, Ind. Production equipment and accessories of different sizes and designs to meet the varied requirements of small and large plants in many industries are included, together with illustrations, descriptions, and engineering data. A portion of the equipment illustrated and described includes spray guns, dry and water wash spray booths, air compressors, air and fluid hose, pressure gages, circulating pumps and systems, oil and water extractors, and Thermatic (hot) spray units by which continuously circulating finishing material can be safely heated.

Serving as an up-to-date and informative reference book for users of spray equipment and accessories, the catalog includes descriptions and illustrations of air replacement systems, water wash reclaiming-type spray booths, and automotive booths.

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**Manhattan Cut-Off Wheels.** A bulletin covering grade recommendations, cutting performance data, and operating suggestions for Manhattan Cut-Off Wheels used on machines made by Stone Machinery Company has been issued by the Abrasive Wheel Dept., Manhattan Rubber Div., Raybestos - Manhattan, Inc., Passaic, N. J. Also included are interesting photos showing Stone machines equipped with Manhattan Wheels in operation. Copies may be obtained by requesting **Bulletin No. 6921.**


**Modern Masking Materials and Methods for Fabrication and Spray Finishing**

**By Arthur P. Schulze**

***64 Pages*** ***47 Illustrations***

Written for department superintendents, shop foremen, process and finishing engineers . . . this manual is a source of ideas for saving time, cutting costs and getting better product quality.

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So let's say "NO SALE" to the *ism* peddlers who would have us swap our U. S. A. system of free competition for their "planned" regimentation—trade our U. S. A. freedom and plenty for their serfdom and poverty!

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**c/o PRODUCTS FINISHING,**
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Excellent position vacancy—laboratory—group leader for synthetic enamel and clear formulations for industrial coatings end use. Experience required. Positions for chemists and formulators are also open. Reply to J. Holle, Finishes Division, Interchemical Corporation, 1754 Dana Avenue, Cincinnati 7, Ohio, giving complete qualifications including salary requirements.

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Good opening for right man who is qualified in all phases of barrel, slurry and air blast finishing. Some travel involved. Ability to experiment, compare and evaluate data essential. Tell us about yourself. Replies treated confidentially. Box No. 53, c/o PRODUCTS FINISHING, 431 Main St., Cincinnati 2, Ohio.

**For sale or royalty basis; patented buffing, polishing, grinding, etc. controls. Eliminates entirely the necessity for manual adjustment of wheels. These controls proven by three years use on test installation. P. J. Belcourt, 827 Broad Street, Meriden, Connecticut.**

This Opportunity Section is available for classified advertisements. For advertising rates and other information address:

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Manufacturers' agent with engineering background wanted to sell specialized anti-corrosive coatings to distributors, mill supply jobbers, etc. Exclusive territories still available. Give full details, territory covered, etc., in first letter. Will arrange personal interview.

**RUST-SELE COMPANY**
**Cleveland 5, Ohio**

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**"Not Too Hot To Handle,"** an 18-minute, color, sound film has been released by Walter Kidde & Company, Inc. The picture demonstrates approved fire extinguishing equipment and procedures for Class A, B, and C fires.

During the film, professional technicians use all recognized types of portable extinguishers. Among the various agents demonstrated are water, carbon dioxide, dry chemical, foam, and vaporizing liquid.

The film is available nationally through any of Kidde's six district offices (Chicago, Detroit, Philadelphia, Dallas, Atlanta, Los Angeles), or upon request to any Kidde distributor.

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